

Index

Download a printable copy of this index at ppi2pass.com/cerminde.

- 1/3 load increase, 68-3
- 1%
 - flood, 20-6, 20-7
 - storm, 20-5
- 2, 4-D, 32-12
- 10-minute unit hydrograph, 20-13
- 18-kip ESAL, 76-20
- 60-degree method, 40-2
- 80%
 - rated circuit breaker, 84-9
 - rule, 84-9
- 85th percentile speed, 73-4
- 100% rated circuit breaker, 84-9
- 100-year
 - storm, 20-5, 20-6
 - flood, 20-6
- α -method, 38-3

- A**
- AAR, 48-2
- AASHTO Road Test, 77-5
- AASHTO, G-1
 - concrete compressive stress limit, prestressing tendon, 56-8 (tbl)
 - effective flange width, 57-2
 - flexible pavement design nomograph, 76-23 (fig)
 - Green Book* parallel parking design, 73-22 (fig)
 - Highway Safety Manual*, 75-2
 - lump-sum loss, 56-4
 - PCI standard girder, 56-8
 - PCI standard girder section, 56-8 (fig)
 - PCI standard girder section, properties, 56-9 (fig)
 - required curve lengths, 79-14 (tbl)
 - resistance factor, 56-7 (tbl)
 - rigid pavement nomograph, 77-8 (fig)
 - soil classification, 35-3, 35-4
 - strength reduction factor, 56-7 (tbl)
 - tensile stress limit in prestressed concrete, 56-7 (tbl)
- Abandonment, G-1
- Abbreviation, stake marking, 81-2 (tbl)
- Above-ground storage tank, 33-1
- Abrams' strength law, 48-4
- ABS pipe, 16-9, 28-4
- Abscissa, 7-2
- Absolute
 - acceleration, 71-10
 - convergence, 3-13
 - English System, 1-4
 - parallax, 78-20
 - position, 71-10
 - pressure, 14-2
 - velocity, 71-10
 - viscosity, 14-6 (ftn)
 - volume method, 49-2
 - volume method, concrete, 77-2
- Absorbed
 - asphalt, 76-9
 - dose, G-1
- Absorber, spray tower, 34-3 (fig)
- Absorption, G-1
 - coefficient, 22-10, 31-9
 - coefficient, gas, 31-9 (tbl)
 - dry, 34-17
 - dynamometer, 85-13
 - factor, 34-21
 - gas, 34-2
 - masonry, 67-5
 - process, 34-2
- Abstraction, initial, 20-2
- Abundance, relative, 22-2
- AC machine, 84-11
- Accelerated
 - Cost Recovery System, 87-22
 - depreciation method, 87-22
 - flow, 19-21, G-1
- Accelerating force, railroad, 75-4
- Acceleration
 - absolute, 71-10
 - angular, 71-7
 - Coriolis, 71-8, 71-9
 - head *C*-value, 18-2 (tbl), 18-3 (tbl)
 - instantaneous center of, 71-14
 - linear, 71-4
 - normal component, 71-8
 - of gravity, 1-2
 - relative, 71-10
 - resultant, 71-8, 71-14
 - tangential, 71-8
 - uniform, 71-3
 - uniform, formulas, 71-4 (tbl)
- Accelerator set, 48-3
- Acceptance, 88-3
 - testing, concrete, 49-1
- Access
 - control of, G-5
 - point, 73-3
 - right of, G-12
- Accessibility, 19-16
- Accessible parking, 73-23
 - space, 73-23
- Accident, 75-15
 - data, 75-15
 - data, analysis, 75-10
 - history warrant, signalization, 73-18
 - log, 83-2 (ftn)
 - modeling, vehicle, 75-13
 - PDO, 75-11
 - pedestrian, 75-15
 - rate, 75-11
 - rate, OSHA, 83-2
 - type, 75-12
- Accidental error, 85-2
- Accommodation, reasonable, 82-9
- Account
 - accumulated depreciation, 87-23 (ftn)
 - asset, 87-33
 - equipment, 87-23 (ftn)
 - expense, 87-37
 - ledger, 87-33
 - liability, 87-33
 - owners' equity, 87-33
- Accounting, 87-36
 - convention, 87-34 (ftn)
 - cost, 87-36
 - equation, 87-33
 - job cost, 87-36
 - principle, standard, 87-34 (ftn)
 - process cost, 87-36
- Accreditation
 - Board for Engineering and Technology, 89-1 (ftn)
- Accrual system, 87-34
- Accumulation, 8-7
- Accumulator, 17-39
- Accuracy, 85-1
 - concrete batch, 49-2
 - degree of, 78-5
 - level of, 78-4
 - order of, 78-4
- Accurate experiment, 11-11
- ACI
 - coefficient, analysis, 51-2
 - shear coefficient, 47-19
- Acid, 22-12, G-1
 - amino, 23-1 (tbl)
 - binary, 22-4
 - carbonic, 22-21, 22-23, 25-2, 31-9, 34-23 (ftn)
 - carboxylic, 23-2 (tbl)
 - constant, 22-15
 - deoxyribonucleic, 27-2
 - dissociation constant, A-92
 - extractable metal, 28-14
 - fatty, 23-2 (tbl), 27-9
 - formed bacteria, 30-15
 - fulvic, G-7
 - gas, 32-4
 - haloacetic, 25-10
 - humic, G-8
 - hydrochloric, 25-9, 32-4
 - hypochlorous, 25-9
 - organic, 23-2 (tbl)
 - polyprotic, 22-17
 - rain, 32-4
 - ribonucleic, 27-2
 - splitting bacteria, 30-15
 - sulfuric, 32-4
 - ternary, 22-4
 - test ratio, 87-35
 - volatile, 27-9
- Acidity, 22-21, 25-2
- Acoustic
 - emission testing, 43-12
 - holography, 43-13
 - velocity, 14-14
- Acquired immunodeficiency syndrome (AIDS), 27-10
- ACR, 48-2
- Acrylonitrile-butadiene-styrene, 16-9 (ftn)
- Act, fraudulent, 88-6
- Actimide, 22-3
- Actinium, 22-3 (ftn)
- Actinon, 22-3
- Action
 - capillary, 14-12
 - composite, 57-1
 - galvanic, 22-18
 - level, 83-8
 - level, noise, OSHA, 83-8
 - line of, 5-1, 41-2
 - noncomposite, 68-14
 - pop, 16-12
 - prying, 65-6, 66-8
 - shear force, 45-17
 - tension field, 63-2
 - tort, 88-6
- Activated
 - carbon, 29-13, 34-3 (ftn)
 - carbon, granular, 26-14

- charcoal, 34-3
- controller, 73-20
- sludge plant, characteristics, 30-3, 30-5
- sludge process, 30-2
- Active
 - collection, gas, 31-6
 - component, retaining wall, A-108, A-109
 - earth pressure, 37-2, 37-3
 - earth pressure coefficient, 37-3
 - pressure, G-1
 - resultant, total, 37-3
 - zone, 37-3
- Activity
 - dummy, 86-13
 - on-arc network, 86-12
 - on-branch network, 86-12
 - on-node network, 86-11
 - pozzolanic, 77-12
 - specific, G-13
- Actual filtering velocity, 34-6
- Acuity, visual, 75-9
- Acute
 - angle, 6-1
 - hazard, 83-5, 83-6
- ADA, 73-23, 82-9
- Adaptation speed, 75-9
- Add chain, 78-8
- Added head, pump, 17-15
- Addition
 - associative law, 4-4
 - commutative law, 4-4
 - of vectors, 5-3
- Aditive, pozzolanic, 48-2
- Adenosine triphosphate (ATP), 27-9, G-1
- Adenovirus, 27-6
- Adfreeze force, 38-6
- Adhesion, 14-12 (ftn), 38-3
 - factor, 38-3
 - road, coefficient of, 75-5
- Adiabatic, 16-2 (ftn)
 - compressibility, 14-13
 - compression, 15-14
 - flame temperature, 24-15
- Adjacent
 - angle, 6-1
 - side, angle, 6-2
- Adjoint, classical, 4-5
- Adjudication, G-1
- Adjunct code, 82-2
- Adjusted weight, 49-3
- Adjusting traverse, 78-14
- Adjustment for access point density, 73-13
- Administrative expense, 87-33
- Admittance, 84-5
- Admixture (*see also type*), 48-3, G-1
 - lithium-based, 48-2
 - water-reducing, 48-3
- Adsorbed water, G-1
- Adsorbent, 26-9
 - material, 34-3 (ftn)
- Adsorption, 26-14, 34-3
 - carbon, 29-13
 - edge, G-1
 - hazardous waste, 34-4
 - ratio, sodium, 25-11
- Advance warning sign spacing, 73-32 (tbl)
- Advanced
 - flue gas cleanup, 34-4
 - oxidation, 34-4
 - oxidation process, 26-21
 - scrubbing, 24-5
 - warning area, 73-31
 - wastewater treatment, 29-3
- Advantage
 - mechanical, 15-16, 41-11
 - mechanical, pulley block, 41-11
 - pulley, 41-11
- Advection, G-1
- Adverse cross slope, 79-8
- Aerated
 - grit chamber, 29-6
 - lagoon, 29-5
- Aeration, 26-4, G-1
 - characteristics, 30-2
 - complete-mix, 30-3
 - conventional, 30-3
 - cost, 30-9
 - diffused air system, 26-4
 - extended, 30-2
 - high purity oxygen, 30-4
 - high-rate, 30-4
 - period, 30-8
 - power, 29-4, 29-5, 30-9
 - sludge, 30-2, 30-4
 - step-flow, 30-3
 - tank, 30-8
 - tapered, 30-3
 - zone of, G-15
- Aerial mapping, 78-18
- Aero horsepower, 17-42
- Aerobe, 27-6, G-1
 - obligate, 27-6
- Aerobic, G-1
 - decomposition, 27-9
 - digester, 30-15
 - digester, characteristics, 30-16 (tbl)
 - digestion, 30-15
 - pond, 29-4
- Aerodynamic equivalent diameter, 32-7
- Affinity law, 18-18
- Afterburner, 34-15
- Age
 - BOD, sludge, 30-5
 - of the suspected solids, 30-5
- Agency, 88-3
- Agent, 88-3
 - chelating, 34-20 (ftn)
 - contract, 88-3
 - oxidizing, 22-7
 - reducing, 22-7
 - weighting, 26-9
- Aggregate, 48-2, 76-3
 - alkali reactivity, 48-2
 - angularity, 76-15
 - ASTM C330, 48-7
 - coarse, 48-2, 76-3, G-1
 - factor, lightweight concrete, 48-6 (tbl)
 - fine, 48-2, 76-3, G-1
 - lightweight, 48-7, G-1
 - mineral, 76-3
 - open graded, 76-3
 - PCC, 77-3
 - properties, 49-2
 - trailer, 80-9
- Aggressive index, 26-19
- Agonic line, G-1
- Agreement, letter of, 88-3
- Ahead
 - stationing, 79-3
 - tangent, 79-2
- AHJ, 82-2
- AIA formula, 26-24
- AIDS, 27-10
- Air
 - atmospheric, 24-8, 30-8
 - atmospheric pressure,
 - properties, A-21, A-22
 - blower, 30-9
 - change, G-1
 - composition, dry, 24-8 (tbl)
 - entrained concrete, 77-3
 - entraining mixture, 48-3
 - entrainment, 77-3
 - excess, 22-9, 24-12
 - flow rate, SCFM, 30-9
 - flush, G-1
 - /fuel ratio, 24-9
 - heater ash, 24-3
 - ideal, 24-9
 - in concrete, 49-3
 - injection, 26-4
 - mean free path, 34-9
 - pollutant, 32-2
 - prewash, 26-14
 - properties, A-21
 - release valve, 16-12
 - resistance, 75-3
 - resistance coefficient, 75-3
 - stoichiometric, 24-9
 - stripper, 34-20
 - stripping, 29-12, 34-20
 - stripping operation, 34-21 (fig)
 - temperature, average daily, 49-6
 - temperature, mean annual, 76-16
 - to-cloth ratio, 34-5
 - toxic, 32-2
 - valve, combination, 16-14
 - valve, double orifice, 16-14
 - valve, siphon, 16-14
 - void, 76-9
 - wash, 26-14
- Airborne survey, 78-6
- Aircraft
 - approach category, 79-21
 - cable, 45-21
- Airfoil, 17-39
- Airport
 - geometric design, 79-21
 - runway, 73-30, 79-21
 - taxiway, 79-21
 - type, 79-21
- Alachlor, 32-12
- Alcohol, 23-2 (tbl), 24-7
 - aliphatic, 23-2 (tbl)
 - aromatic, 23-2 (tbl)
 - ethyl, 24-7
 - grain, 24-7
 - methyl, 24-7
- Aldehyde, 23-1 (tbl), 23-2 (tbl)
- Aldrin, 32-12
- Algae, 27-7, G-1
 - growth, in water, 25-7
 - pretreatment, 26-3
- Algal bloom, 27-7
- Algebra, 3-1
 - matrix, 4-4
- Algebraic equation, 3-2
- Algicide, 26-3
- Alias component, 9-8 (ftn)
- Alidade, 78-9, G-1
- Alignment
 - chart, column, 53-3
 - stake, 81-1, 81-3
- Aliphatic alcohol, 23-2 (tbl)
- Alkali
 - aggregate reactivity, 48-2
 - carbonate reaction, 48-2
 - metal, 22-3
 - silica reaction, 48-2
- Alkaline earth metal, 22-3
- Alkalinity, 22-21, 25-2, 25-4, 25-5 (fig), 26-19, G-1
 - methyl orange, 22-21, 22-22
 - phenolphthalein, 22-21
 - test interpretation, 22-22 (tbl)
- Alkane, 23-1, 23-3 (tbl), 24-1
- Alkene, 23-1, 24-1
- Alkoxy, 23-1 (tbl)
- Alkyl, 23-1 (tbl)
 - halide, 23-2 (tbl)
- Alkyne, 23-1, 23-2 (tbl), 24-1
- All
 - directional interchange, 73-25
 - lightweight concrete, 48-6, 48-7
 - red clearance period, 73-21
 - volatile treatment, 22-24
- Allergen, 32-4
- Alligator crack, 76-5
- Allocthonous material, 25-7
- Allowable
 - bearing capacity, 36-2
 - bearing strength, 59-18, 61-9
 - bending stress, 59-15
 - compressive strength, steel column, 61-4
 - floor area, 82-8
 - height, building, 82-8

- load, fastener, 65-3
 - strength design, 58-5, 59-8
 - stress, 45-2, 50-2
 - stress design, 50-3, 58-5, 59-8
 - stress design method, 50-2
 - stress rating method, 74-2
 - stress, bending, 59-15
 - stress, sheet piling, 39-4 (tbl)
 - Allowance
 - depletion, 87-24
 - trade-in, 87-18
 - Alluvial deposit, G-1
 - Alluvium, G-1
 - Alpha, 11-14
 - risk, 11-14
 - value, 85-5
 - Alphabet, Greek, 3-1
 - Alternate
 - depth, 19-16, G-1
 - mode, 73-19
 - mode operation, 73-19
 - Alternating
 - current, 84-2, 84-4
 - sign series, 3-13
 - Alternative
 - comparison, 87-4
 - disinfectant, 25-10
 - disinfection, 29-13
 - hypothesis, 11-15
 - sewer, 28-4
 - to chlorination, 25-10, 26-21
 - Alternator, 84-11 (ftn)
 - Altitude valve, 26-24, 26-25
 - Alum, 26-8
 - Aluminum, A-116, A-117, A-118
 - structural, A-115
 - structural, properties, A-115
 - Amber period, 73-21
 - American
 - Insurance Association equation, 26-24
 - Insurance Association formula, 26-24
 - National Standards Institute, 82-3
 - Society of Civil Engineers, 89-1
 - wire gauge, 84-8
 - Americans with Disabilities Act, 82-9
 - Amictic, G-1
 - Amide, 23-2 (tbl)
 - Amine, 23-1 (tbl), 23-2 (tbl)
 - filming, 22-23
 - neutralizing, 22-23
 - polar, 22-23
 - Amino acid, 23-1 (tbl), 23-2 (tbl)
 - Ammonia
 - in wastewater, 28-14
 - in water, 25-8
 - nitrogen, in wastewater, 28-14
 - removal, in wastewater, 29-3, 29-13
 - slip, 34-19 (ftn)
 - stripping, 28-14, 29-13
 - toxic effect on fish, 25-8
 - un-ionized, in water, 25-8
 - Amoeba, 27-8
 - Amoeboid, 27-8
 - Amortization, 87-24
 - Amount, factor compound, 87-5
 - Ampacity, 84-8
 - Ampere, 84-2
 - Amperometric sensor, 85-3
 - Amphoteric behavior, G-1
 - Amplification
 - factor, moment, 53-5
 - force, 41-11
 - Amplified end moment, 53-5
 - AMU, G-2
 - Anabolic, 27-9
 - Anabolism, G-1
 - Anabranch, G-1
 - Anaerobe, 27-6, G-2
 - digester, 30-16
 - obligate, 27-6
 - Anaerobic, G-2
 - decomposition, 27-9
 - digester, characteristics, 30-17
 - digestion, 30-15
 - pond, 29-4
 - Analysis (*see also type*), 47-1
 - accident data, 75-10
 - ACI coefficient, 51-2
 - beam-column, 62-2
 - break-even, 87-38
 - chemical, 22-6
 - column, 61-5
 - combustible, 24-2
 - comparative, 87-17
 - cost-benefit, highway safety, 75-18
 - descriptive, safety, 75-2
 - dimensional, 1-8
 - economic life, 87-4
 - economic, engineering, 87-2
 - elastic second-order, 53-1
 - error, 78-2
 - first-order, 53-1
 - Fourier, 9-7
 - frequency, 9-8 (ftn)
 - gravimetric, 22-6, 24-2
 - horizon, 87-17
 - hydrograph, 20-7
 - incremental, 87-17
 - inelastic first-order, 47-2
 - inelastic second-order, 47-2
 - life-cycle cost, 86-7
 - nonlinear second-order, 53-1
 - numerical, 12-1
 - period, 76-19
 - plastic, 47-2
 - proximate, 24-2
 - quantitative predictive, 75-2
 - replacement/retirement, 87-4
 - risk, 87-44
 - sensitivity, 87-44
 - signature, 9-8 (ftn)
 - strength, doubly reinforced section, 50-24
 - structural, 47-1
 - tension member, 60-4, 60-5 (fig)
 - time-series, 9-8 (ftn)
 - ultimate, 22-5, 22-6, 24-2
 - uncertainty, 87-44
 - value, 87-44
 - volumetric, 24-2
 - Analytic function, 8-1
 - Analyzer
 - FFT, 9-8
 - signal, 9-8
 - spectrum, 9-8
 - Anchor
 - pull, 39-5
 - trench, 31-4
 - Anchorage
 - masonry, 67-6
 - requirement, shear
 - reinforcement, 50-23 (fig)
 - shear reinforcement, 50-23
 - Anchored bulkhead, 39-5
 - Andesite porphyry, 35-32
 - Andrade's equation, 43-16
 - Anemometer, 17-27
 - hot-wire, 17-27
 - Angle
 - acute, 6-1
 - adjacent, 6-1
 - adjacent side, 6-2
 - banking, 79-7
 - bearing, 78-12 (fig)
 - between figures, 7-8
 - between lines, 6-1
 - complementary, 6-2
 - contact, 14-12
 - deflection, 78-12, 78-13, 79-4
 - direction, 5-2, 7-5
 - explement, 78-13
 - external friction, 37-5
 - face, 6-6
 - friction, external, 37-4 (tbl)
 - friction, soil, 37-4 (tbl)
 - function of, 6-2
 - helix thread, 45-14
 - hypotenuse, 6-2
 - interfacial friction, 31-5 (tbl)
 - interior, 78-13, 79-2
 - internal friction, 35-17, 35-26, 40-7, 43-8, 72-6
 - internal friction, pile, 72-7 (fig)
 - intersection, 79-2
 - lead, bolt, 45-14
 - lift check valve, 16-12
 - measurement, 78-13 (fig)
 - measurement equipment, 78-12
 - measurement method, 78-12
 - miscellaneous formula, 6-4
 - obtuse, 6-1
 - of depression, 6-2
 - of elevation, 6-2
 - of intersection, 7-8
 - of repose, 72-6, 80-4
 - of static friction, 72-6
 - opposite side, 6-2
 - parking, 73-22
 - plane, 6-1
 - power, 84-7
 - rebound, 72-17
 - reflex, 6-1
 - related, 6-1
 - repose, 40-7
 - right, 6-1
 - rupture, 43-8
 - solid, 6-6
 - spiral, 79-19
 - stall, 17-40
 - station, 78-13
 - straight, 6-1
 - supplementary, 6-1
 - to the right, 78-12
 - total deflection, 79-19
 - traverse, 78-13 (fig)
 - triangular, 6-6
 - twist, 43-8, 45-14
 - type (*see also by name*), 6-2
 - valve, 16-12
 - vertex, 6-1
 - vertical, 6-2
 - wall friction, 37-5
 - yaw, 17-28
- Angoff procedure, modified, xxxi
- Angstrom, A-1, A-2
- Angular
 - acceleration, 71-7
 - frequency, 84-4
 - impulse, 72-14
 - momentum, 17-33, 72-3 (fig)
 - motion, 71-7
 - orientation, 5-1
 - perspective, 2-3
 - position, 71-7
 - velocity, 71-7
- Angularity, aggregate, 76-15
- Anhydride, 23-3 (tbl)
- Anion, 25-1, G-2
- Anisotropic material, 5-1
- Annual
 - air temperature, mean, 76-16
 - amount, 87-7
 - benefit, 73-27
 - capital cost, 73-27
 - cost, 87-7
 - cost method, 87-15
 - cost, equivalent uniform, 87-16
 - effective interest rate, 87-5
 - equivalent cost, 87-16
 - growth rate, average, 3-11
 - return method, 87-15, 87-16
 - traffic, 73-4
- Annuity, 87-7
- Anode, sacrificial, 22-19

- Anoxic
 condition, 27-6
 decomposition, 27-9
 denitrification, 27-6
- ANSI, 82-3
- Antecedent
 moisture condition, 20-17 (ftn)
 runoff condition, 20-17
- Anthracite coal, 24-4
- Anthrafil, 26-13
- Anti
 -lock brake, 75-6
 -skid brake, 75-6
- Anticlinal spring, G-2
- Antiderivative, 9-1
- Antireversal check valve, 16-12
- Antoine equation, 14-10 (ftn)
- Apex, 41-22
- Aphelion, 72-21
- API scale, 14-5
- Apogee, 72-21
- Apparatus
 breathing, 83-6
 Golgi, 27-2
 Orsat, 24-12
 osmotic pressure, 14-10
 vane-shear, 35-29
- Apparent
 color, in water, 25-8
 modulus, 43-11
 specific gravity, 76-8
 specific gravity, asphalt mixture, G-2
 yield stress, 43-7
- Application
 FE exam, 90-2
 point of, 5-1
- Applied
 impulse, 72-15
 load, pressure from, 40-2
- Appraisal, economic, HSM, 75-18
- Approach, 73-15
 category, aircraft, 79-21
 tangent, 79-1, 79-2
 velocity, 21-4
 velocity of, 16-4, 17-16, 17-17
- Approximate structural methods, 47-18
- Approximation
 series, 8-8
 small angle, 6-3
- Appurtenance, G-2
- Apron, G-2
- Aquatic plant, 25-8
- Aquation, 22-11
- Aquiclude, 40-10, G-2
- Aquifer, 21-1, G-2
 confined, 21-2
 free, 21-1, 21-2
 unconfined, 21-1, 21-2
- Aquifuge, G-2
- Aquitard, G-2
- Aramid
 fiber, 32-4
 tendon, 56-6
- Arbitrary
 proportions method, 49-2
 volume method, 49-2
 weight method, 49-2
- Arc, 20-17, 86-10
 basis, 79-3
 length, 71-8
 length, by integration, 9-5
 shield, 64-4
- Archimedes' principle, 15-16
- Architect, 88-4
- Arctic, 32-12
- Area, A-7, A-114
 bar, 50-12 (tbl)
 between two curves, 9-4
 bolt, tensile stress, 65-4
 bounded by irregular area, 78-18 (fig)
 by integration, 9-4
 centroid of an, 42-1
 circulation, pedestrian, 73-18
 conversion, SI, A-3
 critical net, 60-3
 effective net, 60-3
 first moment, 42-2, 46-5
 frontal, 17-41
 gore, 73-26
 gross, 60-2
 gross filtering, 34-5
 interfacial, 34-21
 irregular, 7-1 (fig)
 law of, 72-20
 mensuration, two-dimensional, A-7
 method, landfill, 31-2
 moment of inertia, 42-3
 moment of inertia, basic shapes, A-114
 net, 60-2
 net filtering, 34-5
 reduction, 43-6
 rural, 73-3
 second moment of, 42-4
 specific collection, 34-9
 specific surface, 29-11
 specific, filter, 29-9
 steel reinforcement bar, 50-10, 51-3
 suburban, 73-3
 transformation method, 44-19
 under standard normal curve, A-12
 urban, 73-3
 weaving, 73-26
- Areal, 1-8
 density, 1-8
 dust density, 34-5
 measurement, 1-8
 rain, 20-17
 velocity, 72-20
- Argument, 3-7, 3-8
- Arithmetic
 growth rate, 3-11
 mean, 11-12
 sequence, 3-11
 series, 3-12
- Arm
 machinery, 83-10
 moment, 41-3
 working, 83-10
- Aromatic, 23-3 (tbl)
 alcohol, 23-2 (tbl)
 hydrocarbon, 24-1
 liquid, 14-10 (ftn)
- Array, 4-1 (ftn)
- Arrival type, 73-16
- Arterial, 73-3
 highway, G-2
- Artesian
 formation, G-2
 spring, G-2
 well, 21-2
- Artificial expense, 87-20
- Aryl, (tbl), 23-1
 halide, 23-3 (tbl)
- As
 -built document, 86-16
 fired, 24-3
- Asbestos, 32-4
 cement pipe, 16-9, 26-25, 28-4
- Asbestosis, 32-4
- ASCE, 89-1
- ASD, 58-5
- Ash, 24-3
 air heater, 24-3
 bottom, 24-3, 32-4
 coal, 24-3
 combined, 32-5
 economizer, 24-3
 fly, 24-3, 48-2
 fly, pavement, 77-12
 pit, 24-3
 refractory, 24-3
 soda, 26-15
- ASME long-radius nozzle, 17-32 (ftn)
- Aspect
 ratio, 17-40
 ratio, ellipse, 7-11
- Asphalt, 76-10
 absorbed, 76-9
 binder, 76-2
 binder grade, Superpave, 76-3 (tbl)
 cement, 76-2
 concrete, 76-2, 76-8, 76-10
 concrete composition, 76-4 (tbl)
 concrete mixture, 76-4
 concrete pavement, 76-2
 concrete, full-depth, 76-26 (fig)
 concrete, untreated aggregate base, 150 mm, 76-27 (fig)
 concrete, untreated aggregate base, 6 in, 76-27 (fig)
 content, effective, 76-9
 content, optimum, 76-11
 crumb-rubber modified, 76-29
 cutback, 76-2
 emulsified, 76-2
 emulsion, 76-2, G-2
 grade, 76-2
 grading, 76-2
 hot mix, 76-2, 76-10
 hot rubber mix, 76-29
 mix, 76-3
 mixer, 76-6
 modifier, 76-5, 76-6 (tbl)
 pavement recycling, 76-28
 pavement, full-depth, 76-28
 performance graded, 76-15
 plant, 76-6
 polymer-modified, 76-5
 rubber, 76-29
 rubber-modified, 76-29
 stone mastic, 76-28
 stone matrix, 76-28
 synthetic, 76-29
 target optimum content, 76-11
- Asphaltic coating, 16-11
- ASR, 48-2
 method, 74-2
- Assembly
 door, 82-4
 slider rod, 71-14
- Assessment, life-cycle, 86-7
- Asset
 account, 87-33
 capitalizing, 87-20
 class, 87-20
 current, 87-35
 expensing, 87-20
 fixed, 87-35
 liquid, 87-35
 nonliquid, 87-35
- Assignment, 88-4
- Associative
 law of addition, 3-3, 4-4
 law of multiplication, 3-3, 4-4
 set, law, 11-2
- Assumed
 inflection point, 47-18
 meridian, 78-12
- Assumption, Whitney, 50-8
- ASTM
 C330 aggregate, 48-7
 E119, 82-4
 International, 82-3
 prestressing tendon, 56-5 (tbl)
 soil test, 35-16, 35-17 (tbl)
 standard, pipe, 16-10
 standards, wire reinforcement, A-134
- Asymmetric multiplier, 83-7, 83-8
- Asymmetrical function, 7-4
- Asymptote, 7-2
- Asymptotic, 7-2
- At-rest
 earth pressure coefficient, 37-5
 soil pressure, 37-5

- Atmosphere
 air, 30-8
 earth, 15-13
 pressure, 14-3
 standard, A-3, A-4, A-59
- Atmospheric
 air, 24-8, 30-8
 fluidized-bed combustion, 24-5
 head, 18-6
 pressure, air properties, A-21, A-22
 refraction, 78-9
- Atom, 22-2
- Atomic
 mass unit, 22-2
 number, 22-2, A-83, G-2
 number, elements, A-83
 numbers and weights of the elements, A-88
 structure, 22-2
 weight, 22-2, A-83, G-2
 weight, chemical, 22-2
- Atomizing scrubber, 34-18
- ATP, 27-9
- Atrazine, 32-12
- ATS (*see* Average travel speed), 73-12
- Attack intergranular, 22-19
- Attention and information processing, 75-9
- Attenuator, impact, 75-13
- Atterberg limit, 35-21
 test, 35-3, 35-21
- Attractive rate of return, minimum, 87-16
- Auger
 boring, 40-11
 -hole method, 35-23
- Augmented matrix, 4-1
- Austenitic stainless steel, 22-19 (ftn)
- Authority having jurisdiction, 82-2
- Autochthonous material, 25-7
- Autogenous waste, 34-11 (ftn)
- Autoignition temperature, 24-8
- Automatic
 total station, 78-5
 traffic recorder, 73-6
- Autotroph, 27-4, G-2
- Autotrophic bacteria, 27-6, 28-9
- Auxiliary
 elevation, 2-2
 equation, 10-1
 lane, G-2
 view, 2-2
- Availability, 26-9
- Available
 combined residual, 28-13
 compressive strength, 62-2
 flexural strength, 64-2, 64-3
 hydrogen, 24-3, 24-14
 lime, 26-9
 load, fastener, 65-3
 method, 32-15
 moment table, 59-10
 moment versus unbraced length, 59-3 (fig)
- Average
 annual daily flow, 26-22, 73-4
 annual daily traffic, 73-4
 annual growth rate, 3-11
 change, 11-16
 cost method, 87-38
 cost, weighted, 87-31
 daily air temperature, 49-6
 daily traffic, 73-4
 decrease, 11-16
 end area method, 80-4
 highway speed, 73-3
 increase, 11-16
 power, 84-6, 84-7
 precipitation, 20-2
 pressure, 15-7
 running speed, 73-3
 spot speed, 73-3
 time per unit, 87-43
 travel speed, 73-3, 73-12
- value, 87-30
 value, by integration, 9-4
 value, sinusoid, 84-4
 velocity, 16-8
- Avogadro's
 hypothesis, 22-5
 law, 22-5, G-2
 number, 22-5
- AWWA standard, pipe, 16-10
- Axes, principal, 70-2
- Axial
 -flow impeller, 18-4, 26-11
 -flow reaction turbine, 18-23
 -flow turbine, 18-23, 18-24 (fig)
 load, stiffness reduction factor, 53-4
 loading, 44-12
 member, 41-11
 member, force, 41-12
 member, pin-connected, 41-12
 strain, 43-4
 stress, 35-26
 tensile stress, 60-1
- Axis
 bending, 45-17
 conjugate, 7-11
 major, 7-11
 minor, 7-11
 minor, buckling and bracing, 61-4 (fig)
 neutral, 44-11
 oblique, 2-2
 of rotation, 72-2
 parabolic, 7-10
 principal, 42-8, 59-15
 rotation, 42-7
 torsional, 45-17
 transverse, 7-11
 weak, 59-5
- Axle
 spread-tandem, 76-18
 type, 76-19 (fig)
- Axonometric view, 2-3
- Azimuth, 78-12, 78-13, G-2
 from back line, 78-12
 from north, 78-13
 from south, 78-13
 magnetic, 73-30
- B**
- B box, 80-9
- B₁-B₂ procedure, 62-2
- Babcock formula, 17-10
- BAC-CAB identity, 5-5
- Back
 -calculation, 76-16
 corona, 34-9
 station, 79-3
 stationing, 79-3
 tangent, 79-1, 79-2
- Backfill, 40-8
 inclined, 37-6
 slope, broken, 37-6
- Backsight, 78-10
- Backward
 pass, G-2
 soil pressure, 37-2
- Backwashing
 air wash, 26-14
 filter, 26-13
- Backwater, G-2
 curve, G-2
- Bacteria, 27-6
 acid-formed, 30-15
 acid-splitting, 30-15
 autotrophic, 27-6, 28-9
 carbonaceous, 28-9
 facultative, 27-6
 growth, 27-6 (tbl)
 iron, 27-6
 mesophilic, G-9
 nonphotosynthetic, 27-6
 thermophilic, G-14
- Bag cement, 48-1
- Baghouse, 34-4
 collection efficiency, 34-6
 resistance, 34-5
 typical, 34-5 (fig)
- Balance
 book, 87-33
 dynamic, 70-2
 line, 80-6, 80-7 (fig)
 point, 80-6, 80-7 (fig)
 sheet, 87-34
 sheet, simplified, 87-35 (fig)
 static, 70-2
 water, equation, 20-2
- Balanced
 condition (masonry), 68-6
 curve, 72-8
 draft point, 34-10
 load, electrical, 84-10
 point, column, 52-5
 speed, 72-8
 steel, 68-6
 steel area, 50-6
 tension weld, 66-4
 weld group, 66-4, 66-5 (fig)
- Balancing, 78-14
 chemical equations, 22-7
 closed traverse angles, 78-14
 closed traverse distance, 78-15
 operations, 70-2
 traverse, 78-15
 traverse, least squares, 78-15
- Bale, hay, 80-11
- Ball valve, 16-12
- Ballast
 circuit, 85-10
 thermal, 34-13
- Balling scale, 14-5 (ftn)
- Ballistic pendulum, 72-3 (fig)
- Balloon payment, 87-42
- Ban, land, 33-2
- Bandwidth, 9-8, 73-20
 of frequency analysis, 9-8
- Bank
 cubic yard, 80-1
 -measure, 80-1
- Banking
 angle, 79-7
 days in a year, 87-28 (ftn)
 roadway, 72-8
- Bar
 area, 50-12 (tbl)
 chart, 86-9
 chart, water chemistry, 25-1
 deformed, 48-9 (fig)
 dimension, hard SI (Canadian), 48-9 (tbl)
 dowel, 55-6, 77-12
 headed, deformed, 55-6
 lacing, 61-2 (ftn)
 lattice, 61-2 (ftn)
 purple, 48-10
 reinforcing, 67-6
 steel, 48-8
 tie, pavement, 77-7
 total area, 51-3
- Barometer, 15-2
 multi-fluid, 15-5
- Barometric
 height relationship, 15-13
 pressure, 14-3
- Barrel, 19-27
- Barrier
 brush, 80-11
 concrete, highway, 75-13
 constant slope, 75-13
 F-shape, 75-13
 General Motors, 75-13
 GM, 75-13
 heavy vehicle median, 75-13 (fig)
 highway, 75-13
 Jersey, 75-13

- K-rail, 75-13
 - Ontario, 75-13 (fig)
 - removal, 82-11
- Basalt, 35-32
- Bascule bridge, 57-4
- Base, 3-5, 22-12, G-2
 - breakaway, 75-13
 - cement-treated, 48-8, G-4
 - circle failure, 40-7
 - condition, roadway, 75-15
 - constant, 22-15
 - course, G-2
 - dissociation constant, A-93
 - exchange, 22-22
 - exchange method, 26-17
 - exchange process, 26-17
 - flow, 20-7 (ftn), G-2
 - frangible coupling, 75-13
 - free-flow speed, 73-10, 73-13
 - hinged, pole, 75-13
 - length, weaving, 73-26
 - of the cut, 39-2
 - plate cantilever factor, 61-10
 - plate critical section, 61-10
 - plate, column, 61-9
 - retaining wall, 54-3
 - slip, pole, 75-13
 - time, 20-7
 - tower crane, 83-10
 - unit, 1-5
- Baseball, 17-41 (ftn), 17-42
- Baseline, 80-6
 - rate, 84-7
- Basic
 - accounting equation, 87-33
 - fire flow, 26-23
 - shapes, 42-1, 42-4, A-114
- Basin
 - chemical sedimentation, 29-8
 - sedimentation, plain, 29-6
 - settling, G-13
 - stilling, G-13
- Basis
 - daily compounding, 87-28
 - depreciation, 87-20
 - unadjusted, 87-21
- Batch
 - gravity thickening, 30-14
 - mixer, 76-6
 - trial, 49-2
- Batching, 49-2
- Bath tub distribution, 11-9
- Batter, 37-1
 - decrement, 37-1, 37-12
 - pile, G-2
- Baumé scale, 14-5
- Bayes adjustment, empirical, 75-17
- Bayes' theorem, 11-4
- Bazin formula, 19-4 (ftn)
- Beam (*see also type*)
 - analysis, prestressed, 56-10
 - balanced condition, 50-6 (fig)
 - bearing plate, 59-18
 - bearing plate, nomenclature, 59-19 (fig)
 - bending coefficient, 59-4
 - bending plane, 59-2 (fig)
 - boundary condition, 44-14 (tbl)
 - circular, 50-21
 - column, 44-12, 59-2, 62-1
 - column design, 62-3
 - column analysis, 62-2
 - compact, 59-2
 - composite, 64-1
 - composite, cross section, 64-1 (fig)
 - concrete, cracking, 50-14
 - concrete, deflection, 50-15
 - concrete, design, 50-8, 50-10
 - concrete, maximum deflection, 50-17
 - concrete, shear strength, 50-21
 - conjugate, 44-15, 44-16, 47-6
 - continuous, 46-1, 46-5, 59-11
 - critical stress, 59-8
 - cross section, type, 50-2
 - curved, 44-20 (tbl)
 - deep, 50-27
 - deflection, 44-13, 44-14, 44-15, 44-17, 47-4, 59-5
 - deflection equations, elastic, A-120, A-121, A-122, A-123
 - deflection, prestressed, 56-4
 - deflection, strain energy method, 44-15
 - depth, concrete, minimum, 50-17
 - design selection table, 59-8
 - determinate, type, 41-8 (fig)
 - doubly reinforced, 50-24
 - doubly reinforced, parameter, 50-24 (fig)
 - failure, rotation, 44-19 (fig)
 - fixed-end, 46-1, 46-7
 - frame, 51-6 (fig)
 - hole in, 59-17
 - indeterminate, 46-1
 - indeterminate, formulas, A-128, A-129, A-130, A-131, A-132
 - lateral buckling, 59-3 (fig)
 - load table, 59-10
 - over-reinforced, 50-6
 - prestressing effect on simple, 56-2 (fig)
 - propped cantilever, 46-1
 - reinforced concrete, 50-1
 - reinforcement, 50-2 (fig)
 - serviceability, 50-14
 - shear strength, 50-20
 - shear stress, 44-10
 - soldier, 39-7
 - steel, 59-1
 - steel, analysis flowchart, 59-6 (fig)
 - steel, design flowchart, 59-9 (fig)
 - thickness, minimum, 50-17 (tbl)
 - transverse force, 44-11
 - under-reinforced, 50-6
 - unsymmetrical bending, 59-15
 - wide, 44-17
 - width, minimum, 50-8 (tbl)
 - width, steel, 50-8
 - W-shape, 59-2 (fig)
- Bearing, 45-11, 78-12
 - angle, 78-12 (fig)
 - area, plate, 60-7
 - capacity, 36-1
 - capacity factor, 36-3, 36-4 (tbl)
 - capacity, allowable, 36-2
 - capacity, clay, 36-5
 - capacity, factors, long trench, 39-3
 - capacity, gross, 36-3
 - capacity, net, 36-3
 - capacity, rock, 36-8
 - capacity, sand, 36-7
 - capacity, ultimate, 36-3
 - capacity, ultimate static, pile, 38-1
 - capacity, water table, 36-8
 - connection, 65-2
 - length, plate, 59-19
 - plate, 59-18
 - plate, beam, 59-18
 - pressure, safe, 36-2
 - ratio, California, 35-29, 76-20
 - stiffener, 44-19, 59-18 (fig), 63-2, 63-4 (fig)
 - stiffener design, 63-4
 - strength, available, 65-4
 - strength, steel, 59-18
 - stress, 45-11, 45-12
 - stress, allowable, 65-4
 - test, three-edge, 16-11
 - value, plate, test, 35-31
 - wall, 54-2
- Bed, G-2
 - biological, 29-8
 - chemically active, 34-11
 - moisture level, 24-3
 - residence time, 34-7
 - sand, drying, 30-18
 - sand, filter, 32-14
- Bedding
 - load factor, 40-9
 - mortar, 68-4
- Begin slope rounding, 81-4
- Beginning of curve, 79-3
- Behavior factor, 73-9
- Bell, G-2
 - shaped curve, 11-6
- Belt
 - filter press, 30-18
 - friction, 72-7
 - highway, G-2
 - thickening, gravity, 30-15
 - V-, 72-7
- Benchmark, 78-7
 - official, 78-7
 - temporary, 78-7
- Bend, pipe, 17-36 (fig)
 - force on, 17-36
- Bending
 - axis, 45-17
 - beam load cell, 85-12
 - biaxial, 59-15
 - moment, 44-8 (ftn), 44-11
 - moment diagram, 44-8
 - plane of, 59-2
 - strength, steel beam, 59-2
 - stress, 44-11 (fig), 59-2
 - stress, beam, 44-11 (fig)
 - unsymmetrical, beam, 59-15
 - unsymmetrical, case, 59-15 (fig)
- Beneficial reuse, 30-20
 - program, 30-20
- Benefit
 - annual, 73-27
 - cost ratio method, 87-16
- Bent, G-2, G-3
 - pile, G-11
- Benthic zone, G-3
- Benthos, G-3
- Bentonite, 40-10, G-3
 - cement, 40-10
 - soil, 40-10
- Benzene ring, 23-1 (tbl)
- Berm, G-3
 - filter, 32-14
 - temporary, 80-10
- Bernoulli equation, 16-2, 19-7
 - extended, 17-15
- Bessel equation, 10-5
- Best available
 - control technology, 34-2
 - technology, 34-2
- Beta, 11-15
 - distribution, 86-14
 - method, 38-4
 - ratio, 17-29
 - risk, 11-15
- Bias, 11-11, 85-2
- Biaxial
 - bending, 59-15, 69-5
 - stress, 85-11
- Bicarbonate hazard, 25-11
- Bicyclist crash factor, 75-10
- Bidding, competitive, 89-3
- Bifurcation ratio, G-3
- Billion, 1-7 (tbl)
 - parts per, 22-11
- Bimetallic element, 44-4
- Binary
 - acid, 22-4
 - compound, 22-4
 - fission, 27-8, G-3
- Binder
 - asphalt, 76-2
 - grade, Superpave, 76-3 (tbl)
 - humectant, 32-7
 - specification, 76-15
 - to-dust ratio, 76-15

- Bingham
 fluid, 14-7
 -plastic limiting viscosity, 17-12
 -plastic model, 17-12
- Binomial
 coefficient, 11-2, 11-4
 distribution, 11-4
 probability density function, 11-4
 theorem, 3-3
- Bioaccumulation, G-3
 factor, G-3
- Bioactivation process, G-3
- Bioassay, G-3
- Bioavailability, G-3
- Biochemical oxygen demand
 (*see also* BOD), 28-8, G-3
 oxygen demand test, 27-9
- Bioicide, 27-8, 34-22 (ftn)
- Bioconcentration, G-3
 factor, G-3
- Biodegradable plastic, 32-13
- Biodegradation, 32-13, G-3
- Biofilm filter, 26-14
- Biofilter, 34-6
- Biofiltration, 34-6
- Biogas, G-3
- Biological
 bed, 29-8
 contactor, rotating, 29-11
 contactor, rotating, characteristics, 29-12
 filter, 29-8
 reaction, 27-11
- Biology, cellular, 27-1
- Biomagnification, G-3
 factor, G-3
- Biomass, G-3
 composition, 27-11
 yield, 30-13
- Bioplastic, 32-13
- Bioreactor, 34-7
- Bioremediation, 34-6
- Biosolid, 30-2, 32-2 (ftn)
- Biosorption, 30-3
 process, 30-3, G-3
- Biosphere, G-3
- Biostat, 34-22 (ftn)
- Biot number, 1-9 (tbl)
- Biota, G-3
- Bioventing, 34-7
- Biphenyl, polychlorinated, 32-12
- Bisection method, 3-4, 12-1
 bracket, 12-1
- Bituminous
 coal, 24-4
 coating, pipe, 16-11
 concrete, 76-10
 mix, 76-2
- Black
 pipe, 16-10
 steel pipe, 16-10
- Blacktop, 76-10
- Blade
 jet force on, 17-35
 pitch, circular, 18-4
- Blasius
 equation, 17-5
 solution, 17-45
- Blast-furnace gas, 24-8 (ftn)
- Bleeding, 76-14 (ftn), G-3
 pavement, 76-5
- Blind drainage, G-3
- Block
 and tackle, 41-11
 load, 83-10
 shear failure, 60-4 (fig)
 shear strength, 60-4
 stress, 50-9
- Bloom, G-3
- Blowdown, 22-23, 32-6
- Blower
 air, 30-9
 wastewater, 29-4, 30-10
- Blowing
 pavement, 76-5
 whistle-, 89-3 (ftn)
- Blowup, pavement, 76-5
- Blue center steel, 45-21
- Bluff, G-3
- Blunder, 78-14
- Board
 foot, 1-8
 foot measurement, 1-8
 of directors, 88-2
 of engineering licensing, 90-1
- Bob, plumb, 78-9
- BOCA building code, 82-1
- BOD, 28-8
 escaping treatment, 30-6
 exerted, 27-9
 exertion, 28-9
 loading, 29-9
 removal efficiency, 29-9, 30-6
 removal fraction, 29-9, 30-6
 removal rate constant, 29-5
 seeded, 28-10
 sludge age, 30-5
 soluble, 30-6
 test, 27-9
 treatment efficiency, 30-6
 ultimate, 28-9
- Body, 41-8 (fig)
 burden, G-3
 rigid, 71-1
- Boiler
 circulating fluidized-bed, 34-11
 design, fluidized-bed, 34-11
 efficiency, 24-16
 feedwater characteristics, 22-23
 feedwater quality, 22-24
 fluidized-bed, 34-11
 horsepower, 24-16, 24-17
- Boilerplate clause, 88-4
- Boiling, 14-10
 -point margin, 32-8
- Bolster, 50-2
- Bolt, 45-9, 65-1
 area, tensile stress, 65-4
 common, 65-1
 dimension, 45-11 (tbl)
 family, 45-9
 grade, 45-9
 grade and type, 45-10 (tbl)
 high-strength, 65-1
 marking, 45-10
 material, 58-4
 preload, 45-12, 65-3
 pretension, 65-3
 pretension, minimum, 65-4 (tbl)
 standards, 45-9
 structural, 65-1
 tensile stress area, 65-4
 thread, 45-9
 torque, 45-13
 torque factor, 45-13
 twist-off, 65-1
- Bolted
 connection, 65-2 (fig)
 connection reduction values, 60-3 (tbl)
 simple framing connection, 65-7 (fig)
- Bolting, small column base plate
 anchor, 61-11 (fig)
- Bomb calorimeter, 24-14
- Bond, 87-29
 fully amortized, 87-29 (ftn)
 masonry, 67-3
 pattern, 67-3
 running, 67-3
 yield, 87-30
- Bonded
 strain gauge, 85-8 (ftn)
 tendon, 56-2
- Bonus depreciation, 87-23
- Book
 of original entry, 87-33
 value, 87-23
 value, depreciation method, 87-24 (fig)
 value of stock, per share, 87-36
- Bookkeeping, 87-33
 double-entry, 87-33
 system, 87-33
- Boom
 crane, 83-9, 83-10
 sonic, 14-15
- Boring auger, 40-11
- Boron hazard, 25-11
- Borrow
 common, 80-2
 pit, 80-5
- Bottom ash, 24-3, 32-4
- Bound
 lower, 9-4
 upper, 9-4
 vector, 5-1 (ftn)
- Boundary
 irregular, 7-1
 layer, 16-8 (ftn)
 layer theory, 17-44
 value, 10-1
- Bounded exponential curve, 27-4
- Bourdon pressure gauge, 15-2
- Boussinesq
 contour chart, 40-2
 stress contour chart, A-112, A-113
- Boussinesq's equation, 40-1
- Bowditch method, 78-15
- Box
 closed, 45-15
 section, 61-2
 shape, 59-2
 -shoring, 39-1
- Braced
 column, 45-3, 53-2, 53-5
 cut, 39-1
 cut, clay, 39-2
 cut, medium clay, 39-3
 cut, sand, 39-2
 cut, stability, 39-3
 frame, 53-2 (fig)
- Bracing
 diagonal, 53-2
 lateral, 59-3
 member, 61-1
 spacing, 59-3
- Bracket, 65-5, 65-6
 bisection method, 12-1
 income, 87-25
 plate, 65-5, 65-6
 tax, 87-25
- Braided stream, G-3
- Brake
 anti-lock/anti-skid, 75-6
 assist system, 75-6
 dynamometer, 85-13
 fan, 85-13
 friction, 85-13
 horsepower, pump, 18-9
 Prony, 85-13
 pump power, 18-9
 water, 85-13
- Braking
 distance, 75-6, 75-7
 perception-reaction time, 75-6
 rate, 75-6
 time, 75-6
- Brale indenter, 43-13
- Branch
 pipe, 17-21
 sewer, G-3
- Brass
 pipe, 16-9
 tubing, dimensions, A-48
- Breach
 material, 88-6
 of contract, 88-6
- Break-even
 analysis, 87-38

- point, 87-38
 - quality, 87-38 (fig)
 - Breakaway, 75-13
 - base, 75-13
 - pole, 75-13
 - Breaker
 - 80% rated circuit, 84-9
 - 100% rated circuit, 84-9
 - circuit, 84-8
 - standard circuit, 84-9
 - Breaking
 - chain, G-3
 - strength, 43-3
 - Breakpoint, 28-13, 34-3
 - chlorination, 26-20, 28-13, G-3
 - Breakthrough, 26-13, 29-13, 34-3
 - Breathing apparatus, 83-6
 - Breeze, 24-5
 - Brick, 67-1
 - building, 67-2
 - face, 67-2
 - hollow, 67-2
 - Bridge
 - bascule, 57-4
 - beam tensile zone, 56-8 (fig)
 - concrete deck system, 51-8
 - connector, material, 58-4
 - constant, 85-11
 - crane, 59-16
 - deck, 46-12, 48-11, 57-4
 - deck, composite action, 57-4
 - deck, orthotropic, G-10
 - deflection, 85-9 (ftn)
 - differential series balance, 85-9 (ftn)
 - differential shunt balance, 85-9 (ftn)
 - draw, 57-4
 - element, component, 74-2 (fig)
 - eyebars usage, 60-7 (ftn)
 - full, 85-11
 - functionally obsolete, 74-2
 - half-, 85-11
 - impact factor, 74-4
 - inventory rating level, 74-3
 - load factor rating, 74-3
 - load rating, 74-2
 - null-indicating, 85-9 (ftn)
 - operating rating level, 74-3
 - permit rating level, 74-3
 - rating, load and resistance factor,
 - method, 74-4
 - rating, U.S. DOT (FHWA), 74-1 (tbl)
 - redundancy, 74-4
 - rotary, 73-25
 - segmental construction, 56-7
 - shunt balance, 85-9 (ftn)
 - structurally deficient, 74-2
 - sufficiency rating, 74-2
 - truss, 41-12
 - truss part, 41-13 (fig)
 - vertical lift, 57-4
 - weld size, 66-9
 - weld strength, 66-8
 - Wheatstone, 85-9
 - zero-indicating, 85-9 (ftn)
 - Brimful capacity, 80-9
 - Brinell hardness
 - number, 43-13
 - test, 43-13
 - Brink depth, 19-19
 - British
 - thermal unit, 13-1, A-1, A-2
 - thermal unit, SI conversion, A-3
 - Brittle
 - failure, 43-14, 50-5
 - failure mode, 50-6
 - material, 43-1
 - Brix scale, 14-5 (ftn)
 - Broad
 - crested weir, 19-13
 - fill, 40-9
 - Broken slope backfill, 37-6
 - Bromine, 26-21
 - Brush barrier, 80-11
 - Btu, 13-1, A-1, A-2
 - Bubbling bed FBC, 34-10
 - Bucket, inverted, steam trap, 16-14
 - Buckingham pi-theorem, 1-10
 - Buckling, 45-2
 - beam, 44-18
 - coefficient, web plate, 63-2
 - elastic, 61-4
 - Euler, 61-2
 - flexural, 61-2
 - inelastic, 61-4
 - lateral, 44-19
 - lateral torsional, 59-3
 - load, 53-5, 61-2
 - load theory, 61-2
 - local, 44-19, 59-17 (fig), 61-2, 61-6
 - modification factor, lateral
 - torsional, 59-4
 - stress, 61-2
 - torsional, 61-2
 - vertical, 44-19
 - Budgeting, 86-2, 86-5
 - parametric, 86-6
 - system, 86-6
 - Buffer, 22-12
 - space, 73-32
 - Buick, MacPherson versus, 88-7 (ftn)
 - Building
 - brick, 67-2
 - code, 58-5, 82-1, 82-2
 - code, comprehensive consensus, 82-1
 - Code, International*, 58-5
 - code, NFPA 5000, 82-1
 - cost, 86-4
 - designer, 88-4
 - element, fire resistance, 82-6 (tbl)
 - height, allowable, 82-8
 - Officials and Code Administrators
 - International, 82-1
 - related illness, 32-4
 - type, 82-8
 - Built
 - in end, 46-7
 - up section, 61-1, 63-1
 - Bulk
 - modulus, 14-14
 - modulus, water, 14-14
 - specific gravity, 76-8, 76-9, G-3
 - velocity, 16-8
 - volume, coarse aggregate, 77-4 (tbl)
 - Bulkhead
 - anchored, 39-5
 - cantilever, 39-4
 - flexible, 39-4
 - pivot point, 39-4
 - tied, 39-4, 39-5
 - untied, 39-4
 - Bulking, G-3
 - factor, 80-1
 - sludge, 30-5, 30-12, G-13
 - Bundle, rotation, pipe, 34-16
 - Bunker C oil, 24-6
 - Buoyancy, 15-16
 - center, 15-18
 - pipeline, 15-18
 - theorem, 15-16
 - Buoyant
 - density, 35-8
 - force, 15-16
 - Burden, 87-36
 - budget variance, 87-36
 - capacity variance, 87-36
 - variance, 87-36
 - Buried pipe
 - loading coefficient, 40-8
 - loads on, 40-8
 - Burn-off, stud, 64-4
 - Burner
 - low excess-air, 34-15
 - low NOx, 34-15
 - staged-air, 34-20
 - ultra-low NOx, 34-15
 - Burning
 - mass, 31-10
 - rate, 31-10
 - Burnout velocity, 72-19
 - Bus equivalent, 73-7
 - Business
 - group, 83-2
 - property, 87-20 (ftn)
 - Butte, G-3
 - Butterfly valve, 16-12, 17-13 (tbl)
 - Buttress, 37-1
 - wall, 37-1
 - BWG tubing dimensions, A-49
 - By-product, disinfection, 25-9, 25-10
- C**
- C*
- Bourdon gauge, 15-2
 - chart, 11-16
 - coefficient, rational method runoff, A-81
 - corporation, 88-3
 - C3 building code, 82-1
 - C330 aggregate, ASTM, 48-7
 - Cab, operator's, 83-10
 - Cabinet projection, 2-2, 2-3
 - Cable, 41-19
 - aircraft, 45-21
 - carrying concentrated load, 41-16
 - catenary, 41-19
 - catenary, 41-19 (fig)
 - concentrated load, 41-17 (fig)
 - distributed load, 41-18 (fig)
 - end, 41-20
 - hoisting, 45-21
 - ideal, 41-16
 - parabolic, 41-17 (fig)
 - symmetrical, asymmetrical
 - segment, 41-20 (fig)
 - tension, 72-13
 - tension, accelerating suspended
 - mass, 72-13
 - tension, suspended mass, 72-13 (fig)
 - CaCO₃ equivalents, 22-20, A-85, A-86
 - Cadmium
 - selenide, 85-5
 - sulfide, 85-5
 - Caisson, G-4
 - Cake
 - filter, 30-20
 - sludge, 30-18
 - Calcite, 26-18
 - Calcium
 - carbonate equivalents, A-85, A-86
 - hardness, 25-3
 - Calculation back, 76-16
 - Calculus, fundamental theorem of, 9-4
 - Calibration, 85-2, 85-7
 - factor, 75-16
 - single-point, 85-2
 - thermoelectric constants,
 - thermocouple, A-175
 - California
 - bearing ratio, 76-20, 77-6
 - bearing ratio test, 35-29
 - kneading compactor, 76-14
 - Callendar-Van Dusen equation, 85-5
 - Calming traffic, 73-27
 - Calorimeter bomb, 24-14
 - Calvert model, venturi scrubber, 34-18
 - Calvert's constant, 34-18
 - Camber, 56-5
 - Camp formula, 29-6
 - Camp's correction, 19-5
 - Canon, 89-1
 - Canonical form, row, 4-2
 - Cant, 79-10
 - Cantilever
 - bulkhead, 39-4
 - footing, 36-2

- retaining wall, 37-1, 54-2
- wall, 37-1, 39-4
- Cap
 - landfill, 31-5
 - mushroom, 83-7
- Capacitance, 84-5
- Capacitive reactance, 84-5
- Capacitor, 84-5
- Capacity, bearing, 36-1, 73-14
 - bearing, allowable, 36-2
 - bearing, clay, 36-5
 - bearing, gross, 36-3
 - bearing, net, 36-3
 - bearing, rock, 36-8
 - bearing, sand, 36-7
 - bearing, ultimate, 36-3
 - brimful, 80-9
 - carrying, 27-4
 - design, 38-2
 - design, traffic, 73-5
 - earth-handling equipment, 80-9
 - excess, 87-32
 - field, 31-7
 - heaping, 80-9
 - heat, 13-4
 - ideal, 73-5
 - infiltration, 21-9
 - intersection, 73-14
 - landfill, 31-3
 - maximum, 73-6
 - maximum, traffic, 73-6
 - moment, 50-9
 - pedestrian, 73-21
 - pile group, 38-5
 - point, 38-2
 - pull-out, 38-5
 - reduction factor, 45-2, 50-5
 - sewer, 28-5
 - shaft, 38-3
 - shear, vertical stirrup, 50-22 (fig)
 - skin friction, 38-3
 - specific, 21-4
 - struck, 80-9
 - tensile, pile, 38-4, 38-5
- Capillarity, 14-12
- Capillary
 - action, 14-12
 - water, G-4
- Capital recovery method, 87-15, 87-16
- Capitalized cost
 - 87-7, 87-15
 - method, 87-15
- Capitalizing the asset, 87-20
- Capture, particle, 32-7
- Car resistance, railroad, 75-4
- Carbamate, 32-12
- Carbamide urea, 32-10
- Carbinol, 23-1 (tbl)
- Carbohydrate, 23-3 (tbl), 28-14
- Carbon
 - activated, 34-3
 - adsorption, 29-13
 - dioxide, 31-6 (tbl)
 - dioxide, emission, 32-5
 - dioxide, in leachate, 31-9
 - dioxide, in water, 26-15
 - dioxide, properties, 31-6 (tbl)
 - fiber-reinforced concrete, 48-7
 - fixed, 24-4
 - granular activated, 26-14, 29-13, 34-3
 - monoxide, emission, 32-5
 - powdered activated, 29-13
 - steel, 58-1
- Carbonaceous
 - bacteria, 28-9
 - demand, G-4
- Carbonate
 - hardness, 22-21 (ftn), 25-3, 26-15, G-4
 - hardness removal, 26-15
 - reaction with alkali, 48-2
- Carbonic acid, 22-21, 22-23, 25-2, 31-9, 34-23 (ftn)
- Carbonyl, 23-1 (tbl)
- Carboxylic acid, 23-2 (tbl)
- Carcinogen, G-4
- Card, indicator, 85-14
- Cardano's formula, 3-4
- Carrier, G-4
 - frequency, 85-4
 - slurry, 17-11
- Carrying capacity, 27-4
- Carryover factor, 47-14
- Cartesian
 - coordinate system, 7-3
 - equation form, 3-3 (ftn)
 - triad, 5-2
 - unit vector, 5-2 (fig)
- Carver-Greenfield process, 30-20
- Casagrande method, 35-25
- Cascade impactor, G-4
- Case, Westergaard, 40-2
- Cased hole, G-4
- Cash
 - flow, 87-3
 - flow analysis, 87-8
 - flow diagram, 87-3, 87-11 (fig)
 - flow factor, 87-6, A-177, A-178
 - flow, (discounting) factor, 87-6
 - flow, beginning of year, 87-11 (fig)
 - flow, exponential gradient series, 87-4
 - flow, exponentially decreasing, 87-26
 - flow, gradient series, 87-4
 - flow, missing part, 87-10 (fig)
 - flow, phantom, 87-4 (ftn)
 - flow, single payment, 87-3
 - flow, standard, 87-4 (fig)
 - flow, stepped, 87-10
 - flow, superposition of, 87-10
 - flow, uniform series, 87-3
 - system, 87-34
- Cast
 - iron, A-116, A-117, A-118
 - iron pipe, 16-9, 26-25, 28-3, A-44
 - iron pipe dimensions, A-44
- Catabolic, 27-9
- Catabolism, G-4
- Catalyst, 22-13
- Catalytic
 - cracking, 24-2
 - reduction, selective, 34-19
- Categorization, microbe, 27-4
- Category
 - exposure, 48-10
 - severity, 75-11
- Catena, G-4
- Catenary, 41-19
 - cable, 41-19, 41-19 (fig)
 - parameter, 41-19
- Cathodic protection, 48-10
- Cation, 25-1, G-4
- Cauchy
 - equation, 10-5
 - number, 1-9 (tbl)
 - Schwartz theorem, 5-3
- Cause, driver overload, 75-9 (tbl)
- Caustic
 - embrittlement, 22-20
 - phosphate treatment, 22-24
- Cavalier projection, 2-2, 2-3
- Caveat emptor, 88-7
- Cavitation, 18-14, 18-15
 - coefficient, 18-16
 - corrosion, 22-20
 - number, critical, 18-16
 - preventing, 18-15
- CBR, 35-29, 77-6 (fig)
- load, 35-30 (tbl)
- CD test, 35-28
- Cell, 31-3
 - bending beam load, 85-12
 - gram-negative, 27-2
 - height, 31-3
 - membrane, 27-2
 - photovoltaic, 85-4
 - shear beam load, 85-13
 - structural, 41-12
 - structure, 27-1
 - transport, 27-2
 - wall, G-4
 - yield, 30-13
- Cellular biology, 27-1
- Cement
 - asbestos, pipe, 16-9
 - asphalt, 76-2
 - bentonite, 40-10
 - bentonite slurry, trench, 40-10
 - factor, 49-2
 - low-alkali, 48-2
 - portland, 48-1
 - properties, 49-1
 - shrinkage-compensating, 48-2
 - soil, 48-8
 - treated base, 48-8, G-4
 - type-K, 48-2
- Cementing material requirement,
 - concrete, 77-4 (tbl)
- Cementitious material, 48-1
- Center, 7-2
 - entry mixer, 76-6
 - instant, 71-13
 - instantaneous, 71-13
 - of buoyancy, 15-18
 - of force, 72-19, 72-20
 - of gravity, 9-6, 70-1
 - of mass, 70-1
 - of pressure, 15-5, 15-10, 41-5
 - of pressure, shapes, 15-9 (fig)
 - of rotation, 66-7
 - of rotation method,
 - instantaneous, 65-5, 65-6
 - of twist, 45-17
 - of vision, 2-3
 - radius form, 7-10
 - shear, 45-17, 59-15
 - torsional, 45-17
- Centerline velocity, 16-8
- Centipoise, 14-7
- Centistoke, 14-8
- Central
 - angle, curve, 79-2
 - force field, 72-19
 - impact, 72-18
 - limit theorem, 11-14
 - oblique impact, 72-18 (fig)
 - tendency, 11-12
 - view, 2-1
- Centrate, 30-18
- Centrifugal
 - factor, 79-7
 - force, 72-4
 - pump, 18-2, 18-4 (fig)
 - pump characteristic curve, 18-17 (fig)
 - pump efficiency curve, 18-9 (fig)
 - pump, partial emission, forced
 - vortex, 18-13 (ftn)
 - pump, suction side, 18-2
 - ratio, unbalanced, 79-7
- Centrifugation, 30-18
- Centrifuge, 30-18
 - kerosene equivalent, 76-14
- Centripetal force, 72-4, 72-5 (fig)
- Centroid, 9-6, 42-1, A-114
 - of a line, 42-3
 - of an area, 42-1
 - of volume, 70-1
 - plastic, 52-5
 - weld group, A-125
- Centroidal
 - mass moment of inertia, 70-2
 - moment of inertia, 42-3, 42-4
- Century storm, 20-5
- Ceramic ferrule, 64-4
- Cesspool, 29-2
- Cetane number, 24-7
- CFR, G-4
- CFSTR, 30-6

- cgs system, 1-4
 - Chain
 - add, 78-8
 - breaking, G-3
 - cut, 78-8
 - engineer's, 78-7
 - Gunter's, 78-7
 - surveyor's, 78-7
 - Chair, 50-2
 - Chalk, 35-32
 - Challenger, 87-18
 - Chamber
 - diversion, 29-13
 - filter, 32-14
 - grit, 29-6
 - surge, 17-39, 18-24
 - Change
 - air, G-1
 - average, 11-16
 - cordon, 73-27
 - order, 86-16
 - Channel
 - erodible, 19-26
 - nonrectangular, 19-18
 - open, 19-2
 - rectangular, 19-6, 19-8, 19-17
 - routing, 20-23
 - steel, 61-2
 - transition, 19-16
 - trapezoidal, 19-7, 19-8, 19-9
 - triangular, 19-7
 - Channeling, 34-20
 - pavement, 76-5
 - Channelization, 20-23, G-4
 - device, 73-31
 - taper, 73-31
 - Chaos theory, 85-2 (ftn)
 - Chaotic error, 85-2
 - Char, 24-5
 - Characteristic
 - dimension, 16-6
 - equation, 4-8, 10-1
 - floculator-clarifier, 26-12 (tbl)
 - length, 19-18
 - log, 3-5
 - of gasoline, 32-8
 - polishing, 76-4
 - polynomial, 4-8
 - pump, 18-2, 18-12
 - scale, 19-18
 - specific feed, 34-12
 - value, 4-8
 - valve, 16-13
 - vector, 4-8
 - Characteristics
 - activated sludge plant, 30-3, 30-5
 - aeration, 30-2
 - aerobic digester, 30-16
 - anaerobic digester, 30-17
 - final clarifier, 30-5
 - municipal solid waste, 31-2 (tbl), 31-10
 - rotating biological contactor, 29-12
 - sedimentation basin, 29-7
 - sludge, 30-13
 - wastewater, 28-6
 - Charcoal, activated, 34-3
 - Charge
 - electric, 84-2
 - equilibrium, 34-9
 - number, 22-3 (tbl), 22-4
 - Charpy test, 43-15
 - Chart
 - alignment, column, 53-3, 61-3 (fig)
 - bar, 86-9
 - c-, 11-16
 - Cox, 14-10
 - Gantt, 86-9, 86-10
 - influence, 40-2
 - Moody friction factor, 17-6
 - Newmark, 40-2
 - p-, 11-16
 - particle size distribution, 35-3
 - R-control, 11-16
 - sigma, 11-16
 - Taylor, slope stability, 40-7
 - Chat, G-4
 - Check, G-4
 - dam, 80-11
 - erosion, 80-11
 - the box taxation, 88-3 (ftn)
 - valve, 16-12
 - Chelant, 22-24, 26-19 (ftn), 34-20 (ftn)
 - Chelate, 34-20 (ftn), G-4
 - Chelating agent, 26-19 (ftn), 34-20
 - Chelation, G-4
 - Chelator, 26-19 (ftn)
 - Chemical
 - application point, water treatment, 26-3 (fig)
 - atomic weight, 22-2
 - class, 23-1
 - concentration, 22-11
 - equations, balancing, 22-7
 - equilibrium, 22-13
 - flocculation, 29-8
 - formula, 22-4
 - hazard, 83-4
 - loading, 34-23
 - names and formulas, A-88
 - oxygen demand, 28-12
 - precipitation, G-4
 - reaction, 22-6
 - scrubbing, 34-17
 - sedimentary rock, 35-32
 - sedimentation basin, 29-8
 - used in water treatment, A-103
 - Chemically active bed, 34-11
 - Chemistry
 - coefficient, 49-8
 - inorganic, 23-1
 - organic, 23-1
 - Chemocline, G-4
 - Chemoheterotroph, 27-4
 - Chemotroph, 27-4
 - Chert, 35-32
 - Chezy
 - coefficient, 19-4
 - equation, 19-4
 - Manning equation, 19-4
 - Chi-squared
 - degree of freedom, 11-7, 11-8
 - distribution, 11-7, A-13
 - statistic, 11-8
 - test, 75-12
 - Chloramination, 26-21
 - Chloramine, 25-9, 28-13, G-4
 - Chlordane, 32-12
 - Chlorinated
 - organic, 32-12
 - pesticide, 32-12
 - polyvinyl chloride (CPVC) pipe, A-38
 - Chlorination, 26-20, 28-13, 32-6
 - alternatives, 25-10
 - breakpoint, 26-20, G-3
 - contact tank, 29-13
 - pretreatment, 26-2
 - split, G-13
 - targeted, 32-6
 - wastewater, 29-13
- Chlorinator, flow-pacing, 29-13
- Chlorine, 26-20, 32-6
- alternatives, 29-13
- demand, 28-13, G-4
- dioxide, 26-21
- dose, 26-20, 28-13
- dose, well, 21-4
- in pesticide, 32-12
- in water, 25-9
- total residual, 32-6, 34-8
- Chlorofluorocarbon, 32-5
- Chloroplast, 27-2
- Chlorothalonil, 32-12
- Chlorpyrifos, 32-12
- Choke, 19-21
- Choked flow, 19-21
- Chord, 17-40, 41-12, 61-1
- basis, 79-3
- distance, 79-4
- length, 17-40
- modulus, masonry, 67-4
- offset, 79-5 (fig), 79-6
- Chronic hazard, 83-5, 83-6
- Churchill formula, 28-7, 28-8
- Churn, 18-16
- Cilia, 27-8
- Ciliate, 27-8
- Cipoletti weir, 19-13
- Circle, 7-9, A-7
- degenerate, 7-10
- formula, A-7
- Mohr's, 42-8, 44-7
- segment, A-7
- unit, 6-1
- Circuit
 - breaker, sizing, 84-8
 - potentiometer, 85-3 (ftn)
- Circular
 - beam, 50-21
 - blade pitch, 18-4
 - channel ratio, 19-5 (tbl)
 - channel ratios, A-75
 - channel, critical depth, A-76
 - curve, 79-1
 - member, 50-21
 - mil, 84-2, A-3
 - motion, 71-7
 - permutation, 5-5
 - pipe ratios, A-30, A-75
 - pipe, hydraulic element, A-30
 - shaft, design, 45-14
 - transcendental function, 6-2
- Circulating fluidized-bed boiler, 34-11
- design, 34-11
- Circulation, 8-7, 17-40
- area, pedestrian, 73-18
- Circumferential
 - strain, 45-6
 - stress, 45-4, 45-6
- Cis form, 3-8
- Civil
 - complaint, 88-6
 - tort, 88-6 (ftn)
- CJP
 - weld, 66-2, 66-8
- Clam, 27-8
- Clarification, 29-7
- zone, 30-14
- Clarifier
 - chemical, 29-8
 - final, 29-12, 30-4
 - floculator, 26-12
 - grit, 29-6
 - intermediate, 29-12
 - plain sedimentation, 29-7
 - secondary, 29-12
- Class, G-4
- I highway, 73-12
- II highway, 73-12
- III two-lane highway, 73-12
- asset, 87-20
- A surface, 65-3
- B surface, 65-3
- C fly ash, 77-12
- construction, 82-8
- F fly ash, 77-12
- limit, 11-10
- occupancy, 82-6
- pipe, 16-10
- property, bolt, 45-9, 45-10
- survey, 78-5
- Classical adjoint, 4-5
- Classification
 - culvert flow, 19-28 (fig)
 - industry, 83-2 (ftn)
 - soil, 35-3, 83-2
 - soil, AASHTO, 35-4, 35-5

- soil, Unified, 35-4, 35-6 (tbl)
- soil, USCS, 35-4, 35-6 (tbl)
- Classified label, 82-3
- Classic sedimentary rock, 35-32
- Clause, boilerplate, 88-4
- Clausius-Clapeyron equation, 14-10 (ftn)
- Clay, 35-3
 - bearing capacity, 36-5
 - bentonite, 40-10
 - braced cut, 39-2
 - cap, 31-5
 - cohesion, 35-27, 38-3
 - consistency, 35-22
 - consolidation curve, 40-4 (fig)
 - cut in soft, 39-3 (fig)
 - cut in stiff, 39-3 (fig)
 - formation, 35-32
 - heave, 39-3
 - liner, 31-4
 - overconsolidated, 40-3, 40-4 (fig)
 - pipe, vitrified, 16-9, 28-4
 - raft on, 36-9, 36-11
 - sensitivity, 35-29
 - slope stability, 40-7
 - varved, 40-4
 - versus sand, 36-1, 36-2
- Clean
 - coal technology, 24-5
 - out, G-4
- Cleaning coal, 24-5
- Cleanup
 - advanced flue gas, 34-4
 - flue gas, 32-2
- Clear
 - distance, 50-8
 - zone, 75-13
- Clearance, G-4
 - period, all-red, 73-21
- Clearwell, 26-13
- Client, dealing with, 89-2
- Clinker, 24-3
- Climographic projection, 2-3
- Close-sheeting, 39-1
- Closed
 - box, 45-15
 - loop recovery system, 34-4
 - traverse, 78-13
- Closely held corporation, 88-2
- Closure
 - in departure, 78-15
 - in latitude, 78-15
 - traverse, 78-15 (fig)
- Cloth filter, 40-10, 80-11
- Cloud point, 24-7
- Cloverleaf
 - full, 73-25
 - interchange, 73-25
- Cluster
 - information, 81-1
 - stake, 81-1
- CMP, 16-11, A-73
- Co-firing, 31-11
- CO₂, ultimate, 24-13
- Coagulant, 26-8, 29-8
 - dose, 26-9
- Coagulation, 29-8
- Coal, 24-4
 - anthracite, 24-4
 - ash, 24-3
 - bituminous, 24-4
 - blending, 32-8
 - cleaning, 24-5
 - dry ultra-fine, 32-7
 - formation, 35-32
 - lignite, 24-4
 - lump, 24-4
 - micronized, 24-5 (ftn)
 - nut, 24-4
 - property, 24-5 (tbl)
 - run-of-mine, 24-4
 - substitution/blending, 32-15
 - tar epoxy, 16-11
 - technology, clean, 24-5
 - upgrading, 24-5
- Coarse
 - aggregate, 48-2, 76-3
 - aggregate, bulk volume, 77-4 (tbl)
 - aggregate, PCC, 77-3
 - aggregate, properties, 49-1
 - screen, wastewater, 29-6
- Coat
 - prime, G-11
 - seal, G-12
 - tack, G-14
- Coating
 - asphaltic, 16-11
 - bituminous, 16-11
 - pipe, 16-11
 - tar, 16-11
- COD, 28-12
- Code
 - adjunct, 82-2
 - building, 58-5, 82-1, 82-2
 - model, 82-1
 - National Electrical*, 84-8
 - of ethics, 89-1
 - of Federal Regulations, 83-1
- Coding, 75-10
- Coefficient
 - absorption, 31-9
 - ACI, shear, 47-19
 - active earth pressure, 37-3
 - air resistance, 75-3
 - binomial, 11-2, 11-4
 - BPTSF estimation, 73-14 (tbl)
 - cavitation, 18-16
 - chemistry, 49-8
 - Chezy, 19-4
 - conductivity, 35-23
 - constant, 10-1, 10-2, 10-3
 - Coriolis, 19-27
 - correlation, 11-17
 - discharge, venturi, 17-30
 - distribution, G-5
 - drag, 17-41
 - drag, cars, 17-41
 - drainage, 31-7, 76-22, 77-6
 - earth pressure, 37-5
 - end condition, 61-3
 - end restraint, 45-3 (tbl)
 - endogenous decay, 28-7, 30-7
 - film, 30-17
 - flexibility, 47-8
 - friction, 65-3
 - friction, dynamic, 75-5
 - gas absorption, 31-9 (tbl)
 - half-velocity, 28-6
 - Hazen uniformity, 35-2
 - Horton, 19-13
 - layer, 76-22
 - linear expansion, 44-3, 44-4
 - linear thermal expansion, 44-4 (tbl)
 - load transfer, 77-7
 - loss, 17-12, 17-13 (tbl), 17-14
 - Manning's roughness, 19-4, A-73
 - mass-transfer, 34-21
 - matrix, 4-6
 - maximum specific growth rate, 28-6
 - maximum yield, 28-6
 - method of loss, 17-12
 - method of undetermined, 10-4
 - minor entrance loss, 19-28 (tbl)
 - neutral stress, 21-9
 - nozzle, 18-22
 - of absorption, 22-10
 - of compressibility, 14-13, 40-5
 - of consolidation, 40-5
 - of contraction, 17-18, 17-30
 - of creep, 56-3
 - of curvature, soil, 35-2
 - of discharge, 17-18, 17-30
 - of drag, 17-41
 - of earth pressure at rest, 37-5
 - of expansion, thermal, 14-13 (ftn)
 - of flow, 17-30
 - of friction, 72-6, 72-7, 75-5
 - of friction, static, 15-12
 - of friction, tire, 75-5
 - of friction, typical, 72-6 (tbl)
 - of gradation, 35-2
 - of heat transfer, overall, 30-17
 - of lateral earth pressure, 38-3
 - of lift, 17-40
 - of liquid mass transfer, 34-21
 - of passive earth pressure, 37-4
 - of permeability, 21-2
 - of restitution, 72-17
 - of road adhesion, 75-5
 - of rolling friction, 72-8
 - of rolling resistance, 72-8
 - of secondary consolidation, 40-6
 - of skidding friction, 75-6 (tbl)
 - of the instrument, 17-28
 - of thermal expansion, piping, 34-17 (tbl)
 - of thermal resistance, 85-6
 - of transformation, 5-3
 - of transmissivity, 21-3
 - of uniformity, 21-5
 - of variation, 11-13
 - of velocity, 17-17, 17-29, 18-22
 - of viscosity, 14-6
 - of viscous damping, 72-19
 - orifice, 17-17 (tbl)
 - oxygen saturation, 30-9
 - partition, 27-2, G-10
 - pipe, 16-8
 - roughness, 17-8
 - saturation, 67-5
 - shear, ACI, 47-19
 - skin friction, 17-5 (ftn), 17-45, 38-3
 - slip, 65-3
 - smoothing, 87-42
 - solubility, 22-10
 - spillway, 19-13
 - stability, 53-2
 - Steel rainfall, 20-6
 - storage, 21-3
 - strength, 43-5, 76-22
 - thermal expansion, 44-4
 - torque, 45-13
 - unit weight, 49-8
 - valve flow, 17-13
 - viscous, 72-19
 - volumetric expansion, 44-4
 - web plate buckling, 63-2
 - yield, 27-11, 30-7, 30-13
- Cofactor
 - expansion by, 4-3
 - matrix, 4-1
 - of entry, 4-2
- Cofferdam, 39-5
 - cellular, 39-6
 - double-wall, 39-6
 - liner-plate, 39-8
 - single-wall, 39-7
 - vertical-lagging, 39-8
- Cogener, 22-2
- Coherent unit system, 1-2 (ftn)
- Cohesimeter, Hveem, 76-14
- Cohesion, 14-12 (ftn), 35-26, 43-8
 - clay, 35-27
 - gravel, 35-27
 - intercept, 35-26
 - sand, 35-27
 - soil, 35-26
- Cohesionless soil, 37-2
- Cohesive soil, 37-2
- Coke, 24-5
 - oven gas, 24-8 (ftn)
- Cold
 - cracking pavement, 76-5
 - flow, 43-16
 - in-place recycling, 76-28
 - planing, 76-28

- train, 76-28
- weather, 49-6
- weather concrete, 49-6
- Colding equation, 31-7
- Colebrook equation, 17-5, 17-6
- Coli, Escherichiae, G-6
- Coliform, 27-8, G-4
 - fecal, 27-8, G-6
- Collapsing pressure, 45-5 (ftn)
- Collection efficiency, 26-6, 26-7
 - baghouse, 34-6
 - ESP, 34-9
 - generic collector, 34-19
 - venturi scrubber, 34-19
- Collector, 28-2
 - data, 78-5
 - road, 73-3
 - sewer, 28-2
- Collinear, 7-2
 - force system, 41-6
- Collision, 72-17, 75-15
 - diagram, 75-11, 75-17, 75-18 (fig)
- Colloid, 34-23, G-4
- Colloidal material, 14-7
- Color in water, 25-8
- Column, 45-2
 - alignment chart, 53-3, 61-3 (fig)
 - analysis, 61-5
 - base plate, 61-9, 61-10 (fig)
 - braced, 45-3, 53-2, 53-5
 - concrete, 52-2
 - design, 61-5
 - design strength, 52-3
 - eccentricity, 52-3, 52-6
 - eccentricity, minimum, 69-3
 - effective length, 53-3
 - end coefficient, 45-3
 - footing, 36-2, 55-3
 - ideal, 61-2
 - intermediate, 45-4, 61-4
 - laced, 61-2 (ftn)
 - latticed, 61-2 (ftn)
 - long, 52-1, 53-1, 61-4
 - masonry, 69-1
 - matrix, 4-1
 - rank, 4-5 (ftn)
 - short, 52-1
 - slender, 45-2
 - spiral, 52-2
 - spiral wire, 52-3
 - steel, 61-1
 - strip, moment distribution, 51-7 (tbl)
 - strip, slab, 51-6
 - tied, 52-2
 - unbraced, 53-2, 53-5
- Combination, 11-2
 - air valve, 16-14
 - direct, 22-6
 - section, compression, 61-8
- Combined
 - ash, 32-5
 - footing, 36-2
 - residual, 25-9, G-4
 - residual, available, 28-13
 - residual, unavailable, 28-13
 - sewer overflow, 29-13
 - sewer system, 28-2
 - stress, 44-5 (fig)
 - system, G-4
- Combining weight, 22-6
- Combustible
 - analysis, 24-2
 - loss, 24-16
- Combustion
 - atmospheric fluidized-bed, 24-5
 - chamber, primary, 34-13
 - chamber, secondary, 34-13
 - complete, 24-12
 - data, 24-10 (tbl)
 - efficiency, 24-16
 - fluidized-bed, 24-5
 - heat equivalents, A-94
 - heat of, 24-14, A-94
 - incomplete, 24-12
 - loss, 24-16
 - pressurized fluidized-bed, 24-5
 - product, incomplete, 34-14
 - reaction, 24-8, 24-9
 - reaction, ideal, 24-9 (tbl)
 - staged, 34-20
 - stoichiometric, 24-9
 - temperature, 24-15
- Combustor
 - bubbling-bed, 34-10
 - fluidized-bed, 34-10 (fig)
- Comfort, curve length, 79-17
- Comity, 90-2
- Comminutor, 29-7, G-4
- Common
 - bolt, 65-1
 - borrow, 80-2
 - curvature, point of, 79-6
 - excavation, 80-2
 - ion effect, 22-13
 - logarithm, 3-5
 - ratio, 3-11
 - size financial statement, 87-34 (ftn)
- Communication factor, 26-24
- Commutative
 - law of addition, 3-3, 4-4
 - law, multiplication, 3-3
 - set, law, 11-2
- Compact
 - beam, 59-2
 - section, 59-2, 61-6
- Compacted
 - cubic yard, 80-1
 - measure, 80-1
- Compaction, G-4
 - equipment, 35-19 (fig)
 - factor, 31-3
 - relative, 35-18
 - relative, suggested, 35-20
- Compactness, 59-2
- Compactor
 - gyratory, Superpave, 76-15
 - kneading, 76-14
- Company health, 87-35
- Comparative
 - analysis, 87-17
 - negligence, 88-6
- Comparison
 - alternative, 87-4
 - test, 3-12
- Compartment water quality, 32-14
- Compass rule, 78-15
- Compatibility method, 46-2
- Compensation
 - footing, 36-9
 - level, G-4
- Compensatory
 - damages, 88-7
 - fraud, 88-6
- Competent person, OSHA
 - crane, 83-10, 83-11
 - excavation, 83-4
- Competitive bidding, 89-3
- Complaint, 88-6
 - civil, 88-6
- Complement set, 11-1
 - law, 11-2
- Complementary
 - angle, 6-2
 - equation, 10-1
 - error function, 11-8, A-15
 - error function values for positive x values, A-15
 - probability, 11-4
 - solution, 10-3
- Complete
 - combustion, 24-12
 - filtration, 26-2
 - isothermal flow equation, 17-10
 - mix aeration, 30-3, 30-6
 - mixing, G-4
 - mixing model, 26-10
 - penetration groove weld, 66-2, 66-8
- Completion time, 86-14
- Complex
 - conjugate, 3-8
 - Golgi, 27-2
 - matrix, 4-1
 - number, 3-1, 3-7
 - number operation, 3-8
 - plane, 3-7
 - power, 84-6
- Component
 - alias, 9-8 (ftn)
 - key, 34-21
 - moment, 41-3
 - of a vector, 5-2
- Composite
 - action, 57-1
 - action, bridge deck, 57-4
 - action, full, 64-3
 - action, multi-wythe wall, 68-14
 - action, partial, 64-3
 - beam, 64-1
 - beam cross section, 64-1 (fig)
 - beam, deflection design model, 64-2 (fig)
 - beam design, 64-4
 - beam, strength design model, 64-3 (fig)
 - concrete member, 57-1
 - construction, 64-1
 - grid deck, unfilled, 57-4
 - load, 57-3
 - pile, 38-1
 - spring constant, 45-20
 - steel member, 64-1
 - structure, 44-19
- Compositing, wastewater, 28-15
- Composition
 - atmospheric air, 30-8 (tbl)
 - biomass, 27-11
 - dry air, 24-8 (tbl)
 - percentage, 22-6
- Compost, 30-20
- Compostable plastic, 32-13
- Composting
 - in-vessel, 30-20
 - sludge, 30-20
 - static pile, 30-20
- Compound, 22-4, G-4
 - amount factor, 87-5
 - binary, 22-4
 - corrosion-resisting, 48-3
 - curve, 79-6
 - interest, 87-11
 - organic, 23-1
 - organic, family, 23-3
 - properties, A-103
 - ternary, 22-4
 - tertiary, 22-4
 - volatile, inorganic, 32-16
 - volatile, organic, 28-14, 32-16, G-15
- Compounding
 - discrete, 87-7 (tbl)
 - period, 87-28
- Comprehensive Consensus Codes, 82-1
- Compressed soil pressure, 37-2
- Compressibility, 14-1, 14-13
 - adiabatic, 14-13
 - coefficient of, 14-13, 40-5
 - factor, 14-13 (ftn)
 - index, 35-25
 - isentropic, 14-13
 - isothermal, 14-13
- Compressible fluid flow, 17-32
- Compression
 - adiabatic, 15-14
 - air, 30-9
 - controlled section, 50-5
 - controlled strain limit, 50-5
 - index, 35-25, 40-4
 - index, secondary, 40-6
 - isentropic, 30-9

- isothermal, 15-13
- line, virgin, 35-24
- member, 61-8 (fig)
- member, steel, 61-1
- polytropic, 15-14
- ratio, 40-4
- strength, concrete, 77-3 (tbl)
- strength, masonry, 67-3
- wave speed, 17-38
- zone, 30-14
- Compressive
 - development length, 55-6
 - failure, 43-8 (fig)
 - grout, 67-6
 - stiffened, unstiffened element, 61-6 (fig)
 - strength, 43-8
 - strength, concrete, 48-4
 - strength, masonry, 67-3
 - strength, steel column, 61-4
 - strength, unconfined, 35-29
- Compressor efficiency, 30-9
- Concave, 7-2
 - down curve, 7-2
 - up curve, 7-2
- Concavity, 7-2
- Concentrated force, 41-2
 - plate girder, 63-5
- Concentration
 - cell corrosion, 22-19
 - chemical species, 22-11
 - curve, 20-7
 - geometric stress, 44-4
 - ionic, 22-12
 - metal, 28-15
 - saturation, 22-9
 - stress, 44-4
 - stress, press-fit, 45-8
 - time of, 20-3, G-14
 - volatile suspended solids, 30-5
- Concentrator, rotor, 34-4
- Concentric
 - connection, 65-1
 - connection, shear, 65-4
 - cylinder viscometer, 14-6 (ftn)
 - loading, 44-12
 - shear connection, 65-4
 - tension connection, 66-4
- Concrete, 48-1, A-42, A-43, G-4
 - AASHTO compressive stress limit, prestressing tendon, 56-8 (tbl)
 - all-lightweight, 48-6, 48-7
 - asphalt, 76-2, 76-8, 76-10
 - asphalt, mixture, 76-4
 - barrier, highway, 75-13
 - beam, deflection, 50-15, 50-17
 - beam, doubly reinforced, 50-24
 - beam, shear strength, 50-21
 - bituminous, 76-10
 - carbon-fiber-reinforced, 48-7
 - cold-weather, 49-6
 - column, 52-2
 - column, long, 53-1
 - components, properties, 49-1, 49-2
 - compressive strength, 48-4 (fig)
 - consolidation, 49-5
 - cooling, 48-5
 - corrosion, exposure category C, 48-10
 - cover, 50-8, 50-14
 - curing, 48-4, 49-5
 - cylinder pipe, prestressed, 16-10
 - deck system, bridge, 51-8
 - deck, empirical design, 51-8
 - deck, traditional design, 51-9
 - density, 15-12 (ftn), 48-4
 - disintegration cracking, 48-2
 - durability, 49-1
 - fiber-reinforced, 48-3, 48-7
 - flowable, 48-7
 - footing, 55-1
 - form, 49-6
 - formwork, 49-6
 - full-depth asphalt, 76-26 (fig)
 - grout-bonded, 77-13
 - high-performance, 48-6
 - high-slump, 48-3
 - high-strength, 48-6
 - honeycomb, 49-5
 - hot mix asphaltic, 76-2
 - hot-weather, 49-6
 - ingredient proportions, typical, 48-1 (tbl)
 - interaction diagram, reinforced
 - concrete, A-135, A-136, A-137, A-138, A-139, A-140, A-141, A-142, A-143, A-144, A-145, A-146, A-147, A-148, A-149, A-159, A-160, A-161, A-162, A-163, A-164
 - latex-modified, 77-13
 - lightweight, 48-4, 48-6, 48-7
 - lightweight aggregate factor, 48-6 (tbl)
 - masonry unit, 67-1
 - member, composite, 57-1
 - mixing, 49-2, 49-5
 - mixture, proportioning, 77-2
 - MMA, 48-7
 - modulus of elasticity, 48-5 (fig)
 - modulus of rupture, 48-6
 - nonvibration, 48-7
 - normalweight, 48-4, 48-6, 48-7, G-4
 - pavement (*see also type*), 77-1
 - permeability, exposure category P, 48-10
 - pipe, 16-9, 16-10, 28-3, A-42, A-43
 - pipe, prestressed, 16-10
 - pipe, reinforced, 16-10
 - placing, 49-5
 - plain, G-4
 - Poisson's ratio, 48-6
 - polymer, 48-7, 77-13
 - post-tensioned, 56-2
 - pressure, lateral, 49-8
 - prestressed, 56-2
 - prestressed, AASHTO tensile stress limit, 56-7 (tbl)
 - pretensioned, 56-2
 - reinforced, beam, 50-1
 - reinforced, slab, 51-1
 - retarder, 49-8
 - roller-compacted, 48-7, 76-29
 - sand-lightweight, 48-7
 - section, doubly reinforced, 50-24
 - segregation, 49-5
 - self-compactable, 48-7
 - self-consolidating, 48-7
 - self-placing, 48-7
 - shear strength, 48-6, 50-20
 - shrinkage, compensating, 48-2
 - shrinkage-compensating, 48-2
 - slump, 49-1
 - steel fiber-reinforced, 77-13
 - strength acceptance testing, 49-1
 - stress-strain curve, 48-5 (fig)
 - structural lightweight, G-5
 - sulfate, 48-10
 - sulfur, 76-29
 - sulfur-asphalt, 76-29
 - sulfur-extended, 76-29
 - test cylinder, 48-4
 - tremie, 40-10
 - wall, 54-1
 - water pipe, 26-25
 - workability, 49-1
 - Concurrent force system, 41-6
 - Condemnation, G-5
 - inverse, G-8
 - Condensate polishing, 22-24
 - Condenser, cooling water, 32-6
 - Condensing vapor, 34-22
 - Condition
 - anoxic, 27-6
 - antecedent moisture, 20-17
 - antecedent runoff, 20-17
 - dry, 72-6
 - equilibrium, 41-6
 - factor, 74-4
 - international standard metric, 24-2
 - maximum moment, 50-9 (fig)
 - natural gas, standard, 24-2
 - nonlubricated, 72-6
 - oily, 72-6
 - standard, 14-4, 24-2
 - undersaturated, 73-28
 - wet, 72-6
 - Conditional
 - convergence, 3-13
 - probability, 11-4
 - probability of failure, 11-9
 - Conditioner, sludge, 22-24
 - Conditioning, particle, 34-9
 - Conductance, 84-2, 84-5
 - Conductivity, 84-2
 - coefficient, 35-23
 - hydraulic, 21-2
 - water, 25-11, 26-19
 - Conduit
 - buried, 40-8
 - pressure, 16-5
 - Cone
 - influence, 40-2
 - of depression, 21-5, 80-11, G-5
 - penetrometer test, 35-18
 - Confidence
 - interval, 78-2
 - level, 11-14
 - level, z-values, 11-15 (tbl)
 - limit, 11-15, 78-2
 - limit, one-tail, 11-15 (tbl)
 - limit, two-tail, 11-15 (tbl)
 - Configuration, weaving segment, 73-26
 - Confined
 - aquifer, 21-2
 - compression test, 35-24
 - space, 83-6
 - water, G-5
 - Confinement term, 55-5
 - Confining stress, 35-26
 - Confirmed test, G-5
 - Conflagration, G-5
 - Congestion pricing, 73-27
 - Congruency, 7-3
 - Conic section, 7-8
 - Conical pile, 80-4 (fig)
 - Conjugate
 - axis, 7-11
 - beam method, 44-15, 44-16, 47-6
 - beam support, 47-6
 - complex, 3-8
 - depth, 19-23, 19-26, G-5
 - Connate water, G-5
 - Connection
 - bearing, 65-2
 - bolt, 45-10
 - bolted, 65-2 (fig)
 - concentric, 65-4
 - concentric, tension, 66-4
 - eccentric, 45-18, 65-1, 65-5, 66-5
 - flexible, 65-7
 - framing, 65-7
 - fully restrained, 65-7
 - moment-resisting, 65-7
 - moment-resisting framing, 65-8 (fig)
 - nonconcentric, tension, 66-5
 - partially restrained, 65-7
 - pinned, 60-7
 - plate, 60-7
 - reduction value, 60-3 (tbl)
 - rigid framing, 65-7
 - shear, 65-4
 - simple framing, 65-7
 - slip-critical, 65-3
 - tension, 65-6
 - type 1, 65-7
 - type 2, 65-7
 - type 3, 65-7
 - Connector, 65-1
 - material, 58-4
 - shear, 57-2, 64-1, 64-4
 - shear-stud, 64-3

- steel, 58-4
- stud, 64-4
- Conscious, order, 11-2
- ConsensusDOC, 88-5 (ftn)
- Consequential damages, 88-8
- Conservation
 - energy, 16-1
 - law of momentum, 17-33, 72-2
- Consideration, 88-3
- Consistency, 75-10
 - clay, 35-22
 - concrete, 48-4
- Consistent
 - deformation method, 44-19, 46-2, 47-7
 - system, 3-7
 - unit system, 1-2
- Consolidated
 - clay, normally, 40-3
 - drained test, 35-28
 - normally, 35-24
 - normally, curve, 40-4
 - soil, normally, G-10
 - undrained test, 35-28
 - volume method, 49-2
- Consolidation, 40-3, G-5
 - clay, 36-2
 - coefficient of, 40-5
 - concrete, 49-5
 - curve, 40-3, G-5
 - curve, clay, 40-4 (fig)
 - degree of, 40-5
 - parameters, 40-5 (fig)
 - primary, 40-3, 40-4
 - rate, primary, 40-5
 - secondary, 40-3, 40-5
 - secondary, coefficient of, 40-6
 - test, 35-24
 - time factors, 40-5
 - virgin, 35-24
- Constant
 - acid, 22-15
 - acid dissociation, A-92
 - base, 22-15
 - base dissociation, A-93
 - bridge, 85-11
 - Calvert's, 34-18
 - coefficient, 10-1, 10-2, 10-3
 - deflection, 85-12
 - deoxygenation, 28-8
 - dielectric, 34-9
 - dissociation, 22-15
 - elastic, 43-9
 - elastic relationship, 43-9 (tbl)
 - equilibrium, 22-15
 - Euler's, 9-9
 - force, 72-2
 - force, work, 13-2 (fig)
 - formation, 22-15
 - gravitational, 1-2, 72-20
 - growth rate, 3-11
 - Hazen-Williams, A-50
 - head test, 35-23
 - Henry's law, 22-9 (tbl)
 - ionization, 22-15, 22-16 (tbl)
 - Joule's, 13-1
 - learning curve, 87-43 (tbl)
 - logistic growth rate, 27-4
 - Manning, 19-4
 - Manning's roughness, A-73
 - matrix, 4-6
 - meter, 17-29
 - Newton's gravitational, 72-20
 - Newton's universal, 72-20
 - of integration, 9-1, 10-1
 - percentage method, 87-21
 - reaction rate, 22-14, 34-7
 - reaeration, 28-7
 - reoxygation, 28-7
 - scaling, 34-6 (tbl)
 - self-purification, 28-11
 - slope barrier, 75-13
 - spring, 44-3, 45-20
 - stability, 22-15
 - storage, 21-3
 - temperature variation, 28-8
 - thermoelectric, 85-7
 - thermoelectric,
 - thermocouple, A-175, A-176
 - time, 3-11
 - torsional, 59-4
 - universal gas, 14-10
 - value dollars, 87-39
 - warping, 59-3, 59-4
- Constituent, principal organic
 - hazardous, 34-13
- Constrained
 - cylinder, instantaneous
 - center, 72-12 (fig)
 - motion, 72-11 (fig)
- Construction
 - class, 82-8
 - class coefficient, 26-23
 - contract, 88-3 (ftn)
 - cost, 86-4
 - joint, 77-2, 77-12
 - joist, 50-21
 - lien, 88-5
 - manager, 88-5
 - sequencing, 86-8
 - shored, 57-3
 - slip-form, 77-1, 77-2
 - stake, 81-1
 - time, 86-8
 - unshored, 57-3
- Consulting engineer, 90-1
- Consumer risk, 11-15
- Consumption, fuel, 75-3, 75-4
- Contact
 - angle, 14-12
 - stabilization, 30-3
 - tank, 30-4
 - tank, chlorinator, 29-13
 - unit, solid, 26-12
- Contactor, biological, rotating, 29-11
- Containment
 - landfill, 31-2
 - multiple pipe, 34-16
 - wall, 40-10
- Contaminant level, maximum, 25-6, 28-15
- Content
 - moisture, 35-7
 - water, 35-7
- Contingency cost, 86-5
- Continuing curve, point of, 79-6
- Continuity equation, 17-3
- Continuous
 - beam, 46-1, 46-5
 - compounding, 87-28
 - compounding, discount
 - factor, 87-28 (tbl)
 - distribution function, 11-6
 - flow stirred tank reactor, 30-6
 - plastic design, 59-11
- Continuously reinforced concrete
 - pavement, 77-2
- Contour
 - chart, Boussinesq, 40-2, A-112, A-113
 - index, 78-22
 - interval, 78-22
 - line, 78-22
- Contract, 88-3
 - agent, 88-3
 - breach, 88-6
 - construction, 88-3 (ftn)
 - discharge of, 88-6
 - document, 88-3 (ftn)
 - principal, 88-3
 - privity, 88-7
 - requirements for, 88-3
 - standard, 88-5
- Contracta vena, 17-17
- Contracted weir, 19-11
- Contraction, 17-12, G-5
 - coefficient of, 17-18, 17-30
 - joint, 77-11
 - nappe, 19-11
 - sudden, 17-13
- Contractor, 88-4
 - prime, 88-4
- Contraflexure point, 7-2, 8-2, 44-17
- Contrast sensitivity, 75-9
- Contributing factor
 - bicyclist and pedestrian crash,
 - 75-11 (tbl)
 - crash, 75-10 (tbl)
 - crash at intersection, 75-11 (tbl)
- Control
 - chart, 11-16
 - delay, 73-14
 - downstream, 19-21
 - erosion, 80-10
 - erosion, fabric, 80-11
 - inlet, 19-27
 - joint, 77-11
 - NOx, 24-5
 - odor, 29-3
 - of access, G-5
 - on flow, 19-21
 - outlet, 19-27
 - pollution, 32-1
 - SO₂, 24-5
 - station, 78-7
 - sub-task, 75-8
 - upstream, 19-21
 - zone, temporary traffic, 73-31
- Controlled low-strength material, 48-8
- Controller
 - activated, 73-20
 - fixed-time, 73-19
 - multi-dial, 73-19
 - on-demand, 73-20
 - traffic-activated, 73-20
- Convection
 - dust size, 32-7
 - sign, 44-5 (fig)
 - year-end, 87-3
- Conventional
 - aeration, 30-3
 - filtration, 26-2
- Convergence
 - absolute, 3-13
 - conditional, 3-13
 - tests for, 3-12
- Convergent
 - sequence, 3-10
 - series, 3-12
- Converging-diverging nozzle, 17-29
- Conversion
 - factor, A-1, A-2
 - factor, SI, A-3
 - power, 13-6 (tbl)
 - viscosity, 14-8
- Convex, 7-2
 - hull, 7-2, 7-3
- Convexity, 7-3
- Conveyance, 19-4, 19-8
 - factor, Espey, 20-12
 - factor, open
 - channel, A-77, A-78, A-79, A-80
 - factor, trapezoidal
 - channel, A-77, A-78, A-79, A-80
- Conveyor, submerged scraper, 32-5
- Convolution, integral, 10-6
- Cooling
 - concrete, 48-5
 - Newton's law of, 10-10
 - tower, 32-6
 - tower blowdown, 32-6
- Coordinate, 71-1
 - fluid stream, 17-18 (fig)
 - free body diagram, 41-21
 - holonomic, 71-2
 - system, 7-3, 71-1
- Coordination
 - project, 86-15
 - warrant, signalization, 73-18

- Coplanar, 7-2
force system, 41-6
- Copper, A-116, A-117, A-118
IACS, 84-2
loss, 84-17
pipe, 16-9
tubing, 16-9
tubing, dimensions, A-48
water tubing, dimensions, A-47
- Copperas, 26-8
- Cordon charge, 73-27
- Core, 44-13, 85-4
loss, 84-17
wire rope, 45-21
- Coriolis
acceleration, 71-8, 71-9
coefficient, 19-27
- Corner, meander, G-9
- Cornering ratio, 79-7
- Corona
back, 34-9
current ratio, 34-10
power ratio, 34-10
wire, 34-8
- Corporation, 88-2
C, 88-3
closely held, 88-2
professional, 88-2
S, 88-3
subchapter C, 88-3
subchapter S, 88-3
- Correction
factor, curved beam, 44-20 (tbl)
overburden, 36-8
surveyor's tape, 78-8 (tbl)
- Correlation
coefficient, 11-17
Germain, 29-11
Othmer, 14-11
Schulze, 29-11
- Corrosion, 22-19
cavitation, 22-20
concentration cell, 22-19
crevice, 22-19
erosion, 22-19
exposure category C, concrete, 48-10
fatigue, 22-20
fretting, 22-20
galvanic, 22-18
intergranular, 22-19
-resisting compound, 48-3
stress, cracking, 22-20
tendon, 56-6
two-metal, 22-18
- Corrosive substance, 32-2
- Corrugated
metal pipe, 16-11
steel pipe, 16-11
- Corrugation, pavement, 76-5
- Cosecant, hyperbolic, 6-5
- Cosine
direction, 5-2, 7-5, 41-2
first law of, 6-6
function, integral, 9-8, 9-9
hyperbolic, 6-4, 41-19
law of, 6-5
second law of, 6-6
versed, 6-4
- Cost (*see also type*), 87-8, 87-32
accounting, 87-36
aeration, 30-9
analysis, life-cycle, 86-7
annual capital, 73-27
-benefit analysis, highway safety, 75-18
-benefit ratio, 87-16
building, 86-4
capitalized, 87-7
construction, 86-4
contingency, 86-5
direct, 86-9
-effectiveness index, 75-19
-effectiveness method, 75-19
effect of inflation, 86-7
effect of location, 86-7
electricity, 18-9
equivalent uniform annual, 87-16
estimating, 86-3
excavation, 80-9
financing, 86-5
fixed, 86-9, 87-32
fixed and variable, 87-32 (fig) (tbl)
incremental, 87-32
indirect, 86-9
indirect material and labor, 87-33
information, 86-7
life-cycle, 87-20
movable equipment, 86-5
of goods sold, 87-37
of sales statement, 87-34 (ftn)
on, 86-9
operating, 86-9
operating and maintenance, 87-32
opportunity, 87-18
overhead, 86-6
plus fixed fee, 88-5
prime, 86-9, 87-33
professional services, 86-5
recovery period, 87-39 (ftn)
research and development, 87-33
road user, 73-27
semivariable, 87-32
site development, 86-4
standard, 87-36
standard factory, 87-36
sunk, 87-3
-time trade-off, 86-9
total, 87-33
variable, 86-9, 87-32
weighted, 87-31
weighted average, 87-31
- Costing matrix, 86-6
- Cotangent, hyperbolic, 6-5
- Coulomb, 84-2
earth pressure theory, 37-3, 37-5
friction, 72-5
- Coulomb's equation, 35-26
- Count, drag, 17-42
- Counterflexure point of, flexible
bulkhead, 39-4, 39-5
- Counterflow mixer, 76-6
- Counterfort wall, 37-1
- Counterjib, 83-10
- Countermeasure, 75-16
highway safety, 75-15
- Counterweight, 83-9, 83-10
- Couple, 41-4 (fig), 41-9
moment, 41-4
- Coupling
fair, 83-7, 83-8
good, 83-7, 83-8
moment, 41-4
multiplier, 83-7, 83-8
poor, 83-7, 83-8
- Coupon rate, 87-29
- Course, base, G-2
- Cover
concrete, 50-8, 50-14
final, 31-5
plate, 61-2
plate, perforated, 61-2
specified, 50-8 (tbl)
steel, 50-8
type, 20-17
- Covered function, 6-4
- Coversed sine, 6-4
- Cox chart, 14-10
- CPM, 86-11
- CPT value, 35-18
- CPVC pipe, 16-9, A-38
dimensions, A-38
- Crack
alligator, 76-5
concrete-disintegration, 48-2
reflection, 76-5
shear, typical pattern, 50-20 (fig)
- Cracked
moment of inertia, 50-15 (fig), 53-3
transformed moment of inertia, 50-15
- Cracking, 24-2
calculation parameter, 50-15 (fig)
catalytic, 24-2
concrete beam, 50-14
concrete-disintegration, 48-2
hydrocarbon, 24-2
moment, 50-15, 56-10
pavement, 76-5
serviceability, 50-14
shrinkage, 48-2
strength, 40-9
stress-corrosion, 58-7
thermal, 24-2
- Cramer's rule, 3-7, 4-7
- Crandall
method, 78-15
rule, 78-15
- Crane
bridge, 59-16
hydraulic, truck, 83-9, 83-10
in motion chart, 83-11
load chart, 83-11
safety, 83-10
tower, 83-10 (fig)
use, safety, 83-10
- Crash, 73-27, 75-15
contributing factor, 75-10 (tbl)
contributing factor, bicyclist and
pedestrian, 75-11 (tbl)
contributing factor,
intersection, 75-11 (tbl)
cost estimate, societal, 75-19 (tbl)
cushion, 75-13
data, 75-10, 75-15
estimation, 75-16
experience warrant, signalization, 73-18
factor, 75-8
factor, bicyclist, 75-10
factor, intersection, 75-10
factor, pedestrian, 75-10
factor, roadway segment, 75-10
frequency, 75-16 (ftn)
frequency data, 75-18 (fig)
modification factor, 75-16
rate, 75-16 (ftn)
severity, 75-16
site condition, 75-18
time, 86-9
type, 75-15
- Crawl speed, 73-3
- Credit, 87-34
investment, 87-25
investment tax, 87-25
tax, 87-25
- Creed, 89-1
- Creep, 43-16
coefficient of, 56-3
loss, 56-4
modulus, plastic, 43-11
pretension loss, 56-3
primary, 43-16
rate, 43-16
secondary, 43-16
stage, 43-16 (fig)
strain, 43-16
strength, 43-16
test, 43-16
- Crenothrix, 27-6
- Crest
curve, 79-11, 79-14
curve, length, 79-14, 79-15, 79-17
dam, 15-11, 15-12
- Crevice
corrosion, 22-19
salt, 22-24
- Crippling, web, 59-17

- Criteria
 - LOS performance, 73-12
 - pollutant, 32-2
- Critical
 - activity, 86-11
 - cavitation number, 18-16
 - density, 73-6
 - depth, 19-17, 38-2, A-76, G-5
 - depth, circular channel, A-76
 - distance, 17-5
 - excavation height, 39-3
 - factor, 74-1
 - fastener, 45-18
 - flow, 16-7, 19-17, G-5
 - flow, nonrectangular channel, 19-18
 - flow, occurrence, 19-19
 - gap, 73-6
 - lane group, 73-15
 - load, column, 45-2
 - movement, 73-15
 - net area, 60-3
 - oxygen deficit, 28-11
 - part, 65-1
 - path, 86-9, 86-11
 - path method, 86-11
 - point, 8-2, 28-10, 28-11
 - Reynolds number, 16-7
 - section location, 50-21 (fig)
 - section, one-way shear, 55-3 (fig)
 - section, shear in wall footing, 55-2 (fig)
 - section, two-way shear, 55-3 (fig)
 - settling velocity, 26-7
 - slenderness ratio, 45-3, 61-4
 - slope, 19-3, G-5
 - speed, 73-6
 - speed, shaft, 26-12
 - stress, 17-12
 - stress, beam, 59-8
 - use, halon, 32-6
 - velocity, 19-18, 26-6, G-5
 - velocity, sludge, 18-5, 18-6
 - volume-capacity ratio, 73-15
 - zone, 16-7
- Cross
 - beam deck, 46-12
 - Hardy, Professor, 47-13
 - product, 41-3
 - product, triple, 5-5
 - product, vector, 5-4 (fig)
 - section, 2-4 (ftn), 80-2, 80-3
 - section for seven-wire prestressing tendon, typical, 56-5 (fig)
 - section, beam, type, 50-2
 - section, most efficient, 19-9
 - section, trapezoidal, 19-8 (fig)
 - slope, adverse, 79-8
- Crosswalk, 73-21
- Crow's foot, 81-3
 - measurement, 81-3
- Crown, 19-27 (ftn), 79-7
 - runoff, 79-8
- Crud, 22-24 (ftn), 26-18
- Crumb
 - rubber asphalt, 76-29
 - rubber modified asphalt, 76-29
 - rubber modifier, 76-29
- Crushing strength, 40-9
- Crustacean, 27-4
- Crusting agent, 32-7
- Crystallization, water of, 22-5
- CSO, 29-13
- CSTR, 30-6
- CTB, 48-8
- CU test, 35-28
- Cube loaded in shear, 43-8 (fig)
- Cubic yard, 80-1
 - bank, 80-1
 - compacted, 80-1
 - loose, 80-1
- Cue
 - perceptual, 75-9
 - road message, 75-9
- Cuesta, G-5
- Culvert, 17-19, 19-26
 - classification, 19-28
 - design, 19-31
 - entrance loss, 17-20
 - flow classification, 19-28 (fig)
 - pipe, 19-26
 - simple pipe, 17-19 (fig)
- Cumulative
 - frequency table, 11-11
 - mass fraction curve, 26-6
 - rainfall curve, 20-2
- Cunette, G-5
- Cunningham
 - correction factor, 34-9
 - slip factor, 34-9
- Cup-and
 - bob viscometer, 14-6 (ftn)
 - cone failure, 43-5
- Curb
 - flare, 79-5
 - inlet, 28-5
- Cure
 - medium, asphalt, 76-2
 - rapid, asphalt, 76-2
 - slow, asphalt, 76-2
 - speed, asphalt, 76-2
- Curing, G-5
 - concrete, 48-4, 49-5
 - concrete cooling, 48-5
 - moist, 48-5
 - process, 49-5
- Curl, 8-7
- Current
 - asset, 87-35
 - circuit breaker, rated, 84-8
 - circuit breaker, trip, 84-8
 - clear the, 84-8
 - divider, 84-4
 - electrical, 84-2
 - electrical, effect on humans, 83-6 (tbl), 83-7 (tbl)
 - liability, 87-35
 - meter, 17-27
 - protection, circuit breaker, 84-8
 - ratio, 87-35
- Curvature, 78-9 (fig)
 - coefficient of, soil, 35-2
 - earth, 78-9
 - point of, 79-3
- Curve, 7-3
 - area under standard normal, A-12
 - backwater, G-2
 - balanced, 72-8
 - beginning, 79-3
 - bell-shaped, 11-6
 - bounded exponential growth, 27-4
 - circular, 79-1
 - compound, 79-6
 - concave down, 7-2
 - concave up, 7-2
 - concentration, 20-7
 - consolidation, 40-3
 - crest, 79-11, 79-14
 - cumulative rainfall, 20-2
 - deflection angle, 79-4 (fig)
 - degree, 7-3
 - degree of, 79-2, 79-3
 - dissolved oxygen, sag, 28-10
 - drawdown, G-5
 - e-log p*, 35-24, 40-3, 40-4
 - easement, 79-18
 - elements, horizontal, 79-2 (fig)
 - end of, 79-3
 - Euler's, 45-3
 - even symmetry, 7-4
 - flow, 35-22, 43-5
 - graph, 7-3
 - highway, 79-3
 - horizontal, 79-1
 - horizontal, through point, 79-6 (fig)
 - IDF, 20-5
 - intensity-duration-frequency, 20-5
 - layout, 79-3
 - learning, 87-43
 - length, 79-3
 - length, AASHTO required, 79-14 (tbl)
 - length, comfort, 79-17
 - length, crest curve, 79-14, 79-15, 79-17
 - load-elongation, 43-2
 - minimum radius, 79-8
 - number, NRCS, 20-16
 - number, runoff, 20-18, 20-19
 - number, SCS, 20-16
 - overconsolidated, 40-4
 - parabolic, 79-5, 79-12
 - performance, 18-16
 - point of continuing, 79-6
 - power, 43-5
 - preconsolidation, 40-4
 - pump, 18-16
 - q*, G-12
 - railway, 79-3
 - rating, G-12
 - rebound, 35-24
 - recession, 20-7
 - recompression, 40-4
 - reloading, 35-24, 43-7
 - resistance, 75-3, 75-5
 - S*, 27-4
 - S-N*, 43-9
 - sag, 28-10, 79-11, 79-16
 - spiral, 79-18, 79-19 (fig)
 - spiral, maximum radius, 79-21
 - stationing, 79-3
 - stress-strain, 43-2 (fig), 43-4 (fig)
 - system, 18-16
 - tail, 11-7
 - transition, 79-18
 - trapezoidal loading, 41-6
 - unloading, 43-7
 - vertical, 79-11
 - vertical, obstruction, 79-13 (fig)
 - vertical, railway, 79-22
 - vertical, symmetrical parabolic, 79-12 (fig)
 - vertical, through point, 79-13, 79-14
 - vertical, unequal tangent, 79-17
 - vertical, unsymmetrical, 79-17
 - virgin, 40-4
 - Wöhler, 43-9
 - zero air voids, 35-18
- Curved beam, 44-20 (tbl)
 - correction factor, 44-20 (tbl)
- Cushion, crash, 75-13
- Cut
 - and fill, 80-2
 - and-sum method, 41-15
 - base of, 39-2
 - braced, 39-1
 - braced, clay, 39-2
 - braced, sand, 39-2
 - chain, 78-8
 - in sand, 39-2 (fig)
 - in soft clay, 39-3 (fig)
 - in stiff clay, 39-3 (fig)
 - off wall, 40-10
 - over, 87-23 (ftn)
 - over point, 87-23 (ftn)
 - score, -32
 - sectioning, 2-4
 - size, 34-8
- Cutback asphalt, 76-2
- Cutoff, roughness width, 2-4
- Cutting hardness, 43-13, 43-14
- Cyanazine, 32-12
- Cycle
 - fixed-time, 73-19
 - freeze-thaw, 76-16
 - hydrologic, 20-1, G-8
 - integrated gasification/combined, 24-5
 - length, 73-16, 73-17

- length, Greenshields, 73-17
length, resonant, 73-16
length, Webster's equation, 73-16
- Cyclic
strain, 43-9 (ftn)
stress, 43-9 (ftn)
stress ratio, 40-11
- Cycloalkene, 23-2 (tbl)
- Cycloid, 7-4
- Cyclone, 34-7
impactor, G-5
single, 34-7
- Cylinder
-operated pump, 18-2
pipe, prestressed concrete, 16-10
split, testing procedure, concrete, 48-6
thick-walled, 45-5, 45-6
- Cylindrical coordinate system, 7-3 (fig) (tbl)
- Cypermethrin, 32-12
- Cytoplasm, 27-2
- Cytosol, 27-2
- D**
- D*
-cracking, 48-2
-factor, 73-5
load strength, 40-9
- D'Alembert principle, 72-5
- D'Alembert's paradox, 17-2 (ftn)
- Daily
compounding basis, 87-28
traffic, average, 73-4
- Dalton's law, 24-14, 31-6
- Dam, 15-11 (fig)
flood control, 20-21
force on, 15-11
gravity, 15-12 (ftn)
RCC, 48-7, 48-8
spillway, 19-13
- Damage (*see also type*)
frost, 76-30
hydrogen, 22-20
scale, KABCO, 75-16
value, relative fatigue, 76-20
- Damages, 88-7
compensatory, 88-7
consequential, 88-8
exemplary, 88-7
punitive, 88-6
special, 88-7
- Damaging flood, 20-6
- Damper, pulsation (pump), 18-2
- Damping, 87-42
- Dangerous section, 44-11
- Darcian velocity, 21-4
- Darcy, 21-2
equation, 17-6, 17-8
flux, 21-4
friction factor, 17-5 (ftn), A-51, A-52, A-53, A-54
velocity, 21-4
-Weisbach equation, 17-6, 17-7
- Darcy's law, 21-3, 31-7, 35-23
- DART rate, 83-2
- Data
accident, 75-15
collector, 78-5
crash, 75-10, 75-15
crash frequency, 75-18 (fig)
facility, 75-15
spot speed, 73-4
traffic volume, 75-15, 75-16
- Date
exam, 90-3
maturity, 87-29
- Datum, 78-7
- Davis
equation, 75-5
equation, modified, 75-5
- Daylight
line, 81-4
stake, 81-4
- Days
away rate, 83-2
supply of inventory on hand, 87-36
- DBF, 20-6
- DBP, 25-10
- DC
machine, 84-16
motor, A-174
- DDT, 32-12
- de Moivre's theorem, 3-8
- de Morgan's set, law, 11-2
- Dead
load, 41-5, 45-2 (ftn), G-5
load factor, 74-4
- Dead load pressure, 40-8, 40-9
- Deaeration, 28-1
- Dealing with
client, 89-2
employer, 89-2
engineers, 89-3
public, 89-3
supplier, 89-2, 89-3
- Death phase, 27-4
- Debit, 87-34
- Debt service, 86-5
- Decay
coefficient, endogenous, 30-7
endogenous, 28-7
exponential, 10-9
half-life, 10-10
radioactive, 10-9
rate, Velz, 29-11
weld, 22-19
- Decelerated flow, 19-21
- Deceleration braking, 75-6
- Dechlor, 26-21
- Dechlorination, 26-21, 29-13, 32-6, 34-8
- Decile, 11-12
- Decision sight distance, 79-11, G-5
- Deck, 57-4
bridge, 46-12, 48-7, 57-4
bridge, orthotropic, G-10
cross-beam, 46-12
metal, 57-4
slab, 51-8
slab, precast concrete, girder, 51-9
steel (*see also* Deck, metal), 57-4
- Declaration, negative, 32-3
- Declination, 78-12
east, 78-12
magnetic, 78-12
minus, 78-12
plus, 78-12
west, 78-12
- Declining
balance depreciation, 87-21 (ftn)
balance depreciation recovery, 87-26
balance method, 87-21, 87-26
growth phase, 27-4
- Decoloration time, 28-13
- Decomposition, 22-6
aerobic, 27-9
anaerobic, 27-9
anoxic, 27-9
end product of, 27-10 (tbl)
waste, 27-9
- Decrease, average, 11-16
- Decrement, batter, 37-1, 37-12
- Deep
beam, 50-27
strength asphalt pavement, 76-2
well, 80-11
- Defect, spherical, 6-6
- Defendant, 88-6
- Defender, 87-18
- Deficit
critical oxygen, 28-11
oxygen, 28-7
- Definite integral, 9-1 (ftn), 9-4
- Deflection, 44-3
and stiffness, 44-3 (tbl)
angle, 78-12, 78-13, 79-4
angle, curve, 79-4 (fig)
angle, spiral, 79-19
beam, 44-13, 44-14, 44-15, 44-17, 47-4
beam, equations, elastic, A-120, A-121, A-122, A-123
bridge, 85-9 (ftn)
concrete beam, 50-15
concrete beam, long-term, 50-17
concrete beam, maximum, 50-17
constant, 85-12
control, minimum thickness, 51-2
design, model for composite
beam, 64-2 (fig)
effect of, 62-2
frame, 47-5
immediate, 50-15
instantaneous, 50-15
maximum allowable, 50-18 (tbl)
prestressed member, 56-4
serviceability, 50-15
slab, 51-2
steel beam, 59-5
temperature test, 43-11
truss, 44-17, 47-4
two-way slab, 51-8
voltage, 85-10
- Deflectomete, falling weight, 76-16
- Deformation, 46-2 (ftn)
consistent, method, 44-19
effect of, on internal forces, 53-2 (fig)
elastic, 44-2, 46-2
linear, 47-3
long-term, 50-17
thermal, 44-3
- Deformed bar, 48-9 (fig)
- Degenerate
circle, 7-10
ellipse, 7-11
- Degradability, gas, 34-7 (tbl)
- Degradable plastic, 32-13
- Degradation speed, 75-8
- Degree, 6-1
of accuracy, 78-5
of consolidation, 40-5
of curve, 7-3, 79-2, 79-3
of freedom, 11-7, 47-10, 71-1, 71-12
of freedom, chi-squared, 11-7, 11-8
of indeterminacy, 41-7, 41-8, 46-1
of kinematic indeterminacy, 47-10
of polynomial, 3-3
of reduction, 27-11
of redundancy, 46-1
of saturation, 35-7, 73-15
of static indeterminacy, 47-7
- Dehydration, 23-2
- Deicing chemical, 48-10
- Deionized water, 22-24
- Del operator, 8-7
- Delay
control, 73-14
geometric, 73-14
incident, 73-14
queueing, 73-14
- Delta, G-5
-connection, 84-11
rosette, 85-12
- DELVO admixture system, 48-3
- Demand, 87-42
biochemical oxygen, 28-8, G-3
carbonaceous, G-4
chemical oxygen, 28-12
chlorine, 28-13, G-4
electrical, 84-7
first-stage, G-6
multiplier, wastewater, 28-2
multiplier, water, 26-22 (tbl)
nitrogen, G-10
nitrogenous, 28-9
oxygen, 30-9

- oxygen, biochemical, 27-9
 - second stage, G-12
 - starvation, 73-25
 - water, 26-20, 26-22
- Demineralization, 26-22
- Demineralized water, 22-24
- Denitrification, 27-9, 28-14
 - anoxic, 27-6
- Denitrifier, 27-6
- Dense-graded mix, 76-3
- Density
 - areal, 1-8
 - areal, dust, 34-5
 - buoyant, 35-7
 - concrete, 15-12 (ftn), 48-4
 - critical, traffic, 73-6
 - drainage, G-5
 - dry, 35-7
 - dry, maximum, 35-18
 - equivalent fluid, 37-9
 - ESP power, 34-10
 - fluid, 14-3
 - function, 11-4
 - function, probability, 11-4
 - gauge, nuclear, 35-21
 - index, 35-8
 - jam, G-9
 - jam, traffic, 73-6
 - masonry, 15-12 (ftn)
 - mass, 1-3
 - moist, 35-7
 - on-the-run meter, 76-8
 - optical, 32-15
 - optimum, 73-6
 - pedestrian, 73-21
 - power, ESP, 34-10
 - relative, 35-8, 35-17
 - saturated, 35-7
 - soil, 35-7
 - solid, 35-8
 - submerged, 35-8, 36-8
 - test, field, 35-21
 - test, in-place, 35-21
 - total ramp, 73-9
 - traffic, 73-6
 - weight, 1-3
 - wet, 35-7
 - zero air voids, 35-18
 - zero-voids, 35-8
- Denting, 22-24 (ftn)
- Deoxygenation, 28-8, G-5
 - rate constant, 28-8
- Deoxyribonucleic acid (DNA), 27-2
- Departure, 78-13 (fig)
 - tangent, 79-2
- Dependent
 - event, 11-3
 - system, 71-12
 - variable, 3-2
- Depletion, 87-24
 - allowance, 87-24
- Deposit alluvial, G-1
- Deposition, G-5
- Depreciation, 87-20, 87-21
 - accelerated, 87-22
 - basis, 87-20
 - bonus, 87-23
 - calculation, summary, 87-27 (tbl)
 - period, 87-20
 - rate, 87-21, 87-22
 - recovery, 87-26
- Depression
 - angle, 6-2
 - cone of, 21-5, 80-11, G-5
 - storage, G-5
 - tailwater, 18-24
- Depth, 2-2
 - alternate, 19-16, G-1
 - area-duration, G-5
 - brink, 19-19
 - concrete beam, minimum, 50-17
 - conjugate, 19-23, 19-26, G-5
 - critical, 19-17, 38-2, A-76, G-5
 - critical, circular channel, A-76
 - girder, 63-1
 - hydraulic, 16-6 (ftn), 19-3, G-8
 - impoundment, 20-19
 - normal, 19-6, G-10
 - plate girder, 63-1
 - pressure at a, 1-3
 - profile, 19-22
 - side water, 29-7
 - thickness ratio, 63-2
 - visual, 75-9
 - web, 63-1
- Derivative, 8-1
 - directional, 8-6
 - first, 8-1
 - Laplace transform of, 10-6
 - second, 8-1
- Derived
 - from rule, 32-2
 - unit, 1-6 (tbl)
- Desalination, 26-22
- Descartes' rule of signs, 3-4
- Descriptive analysis, safety, 75-2
- Design (*see also type*)
 - allowable strength, 58-5
 - basis flood, 20-6
 - beam-column, 62-3
 - bearing stiffener, 63-4
 - bearing strength, 59-18, 61-9
 - capacity, 38-2, 73-5
 - column, 61-5
 - composite beam, 64-4
 - concrete deck, traditional, 51-9
 - culvert, 19-31
 - doubly reinforced section, 50-25
 - filtering velocity, 34-5
 - flange, 63-2
 - flood, 20-5, 20-6
 - girder web, 63-2
 - hour volume, 73-4
 - interaction diagram, 52-5
 - intermediate stiffener, 63-4
 - life, 76-19
 - limit states, 58-5
 - load and resistance factor, 58-5
 - mechanistic-empirical, 77-11
 - method, 58-5
 - pavement, methodology, 77-7
 - period, 76-19
 - power, 72-7 (ftn)
 - procedure, shear reinforcement, 50-23
 - professional, 88-7
 - resilient modulus, percentile, 76-25 (tbl)
 - sequencing, 86-8
 - slab, flexure, 51-3
 - slab, shear, 51-3
 - slip resistance, 65-3
 - speed, 73-3, 73-4
 - speed, minimum, 73-4 (tbl)
 - storm, 20-4, 20-5
 - strength, 50-2, 50-5, 52-3
 - T-beam, 50-17
 - tension member, 60-6
 - tension member, LRFD, 60-6 (fig)
 - traffic, 76-17
 - vehicle, 73-3
 - vehicle, standard, 73-3, 73-4 (tbl), 76-18
 - weathering steel, 58-6
- Desorption
 - gas, 34-2 (ftn)
 - thermal, 34-22
- Destruction removal efficiency, 34-13
- Destructive test, 43-14, 82-4
- Desulfurization, flue gas, 24-5, 34-2
- Detector
 - light-sensitive, 85-4
 - resistance temperature, 85-5
 - transducer, 85-3
- Detention (*see also Retention*)
 - period, 26-6, 29-7
 - surface, G-14
 - time, 26-6, 29-7
 - time, hydraulic, 30-5, 30-8
- Detergent, 25-7
- Determinacy, 41-7
- Determinant, 4-3
- Determinate
 - beam, type, 41-8 (fig)
 - reaction, 41-8
 - statically, 41-7
 - truss, 41-13
- Deterministic method, 86-11
- Detour, 73-31
- Detrital mineral, G-5
- Detritus, tank, 29-6
- Deuterium, 22-2
- Deuteron, 22-2
- Deutsch-Anderson equation, 34-9
- Devastating flood, 20-6
- Developed well, 21-4
- Developer, 88-4
- Development length, 55-5
- masonry, 67-6
- Deviate, standard normal, 11-12
- Deviation, standard
 - log, 11-8
 - sample, 11-13
- Deviator stress, 35-26
- Device
 - channelization, 73-31
 - photoconductive, 85-4 (ftn)
 - photoemissive, 85-4 (ftn)
 - pressure relief, 16-12
 - pressure-measuring, 15-2 (tbl)
- Dew point, 24-14
 - flue gas, 24-14
- Dewatering, 26-13, 80-11, G-5
 - groundwater, 31-7
 - sludge, 30-18
- Dezincification, 22-19
- dfg, 24-16
- Diagnosis
 - procedure, transportation network, 75-17
 - transportation network, 75-17
- Diagonal
 - bracing, 53-2
 - matrix, 4-1
 - parking, 73-22
 - shear reinforcement, 50-20
 - tension stress, 50-20
- Diagram
 - cash flow, 87-3, 87-11 (fig)
 - collision, 75-11, 75-17, 75-18 (fig)
 - coordinate, free-body, 41-21
 - drawing, shear and moment, 44-9
 - free-body, 41-8
 - indicator, 85-14
 - influence, 41-10, 46-8, 46-9, 46-11, 46-12, 46-13
 - interaction, 52-5, 52-6
 - mass, 20-21, 80-6
 - moment, 44-8
 - plastic moment, 59-14
 - profile, 80-6
 - Rippl, 20-21
 - shear, 44-8
 - time-space, 73-19
 - valve, 16-13 (tbl)
 - Venn, 11-1 (fig)
- Diameter
 - aerodynamic equivalent, 32-7
 - changes, tapered, 17-13
 - equivalent, 16-6 (ftn) (tbl), 17-43
 - hydraulic, 16-6 (ftn), 17-9, 19-3
- Diametral
 - interference, 45-6
 - strain, 45-6
- Diamond interchange, 73-24
- Diaphragm
 - flexible, 68-12
 - gauge, 15-2
 - pump, 18-3
 - rigid, 68-12

- Dieldrin, 32-12
 Dielectric constant, 34-9
 Diene, 23-1 (ftn)
 Diesel
 -electric locomotive, 75-5
 fuel, 24-7
 Difference
 divided, 12-3
 *R*th-order, 3-10
 table, divided, 12-3 (ftn)
 Differential
 equation, 10-1
 equation, first-order, 10-1
 equation, higher order, 10-8
 equation, homogeneous, 10-1, 10-2
 equation, linear, 10-1
 equation, nonhomogeneous, 10-1
 equation, second-order, 10-1
 gear ratio, 75-3
 leveling, 78-10
 manometer, 15-3
 parallax, 78-20
 positioning, 78-6
 series balance bridge, 85-9 (ftn)
 settlement, 36-1
 shunt balance bridge, 85-9 (ftn)
 term, 9-1
 transformer, 85-4
 Differentiation
 implicit, 8-4
 partial, 8-4
 Diffused air
 injection, 26-4
 system, 26-4
 Diffusion
 -controlled cell, 85-3
 facilitated, 27-3
 passive, 27-2
 Digester
 aerobic, 30-15
 anaerobic, 30-16
 egg, 30-16
 gas (*see also* Methane), 30-16
 Digestion, G-5
 aerobic, 30-15
 anaerobic, 30-15
 Digit, significant, 3-1
 Dihaloacetonitrile, 25-10
 Dilatancy, G-5
 test, 35-3
 Dilatant fluid, 14-7
 Dilation, 44-2
 Dilution
 disposal, G-5
 of position, 78-6
 of position, geodetic, 78-6
 of position, horizontal, 78-6
 of position, vertical, 78-6
 purification, 28-10
 Dimension
 bolt, 45-11 (tbl)
 cast-iron pipe, A-44
 characteristic, 16-6
 concrete pipe, A-42, A-43
 concrete sewer pipe, A-42, A-43
 CPVC pipe, A-38
 ductile iron pipe, A-44, A-45
 nominal, 16-10
 of variables, 1-8 (tbl)
 primary, 1-7
 PVC pipe, A-38, A-39, A-40, A-41
 sieve, 35-2
 steel pipe, A-31, A-32, A-33, A-34,
 A-35, A-36, A-37
 Dimensional analysis, 1-8
 Dimensionless, 1-8, 1-9 (tbl)
 group, 1-8, 1-9 (tbl)
 number, 1-7, 1-9 (tbl)
 unit hydrograph, NRCS, 20-11
 Dimensions
 BWG tubing, A-49
 parking lot, 73-23
 prestressing tendon, 56-6
 seamless steel boiler tubing, A-49
 Dimetric view, 2-3
 Dimictic, G-5
 Dimiper lake, G-5
 Dimple spring, G-5
 Dioxide, sulfur, 32-15
 Dioxin, 32-6
 Direct
 -acting pump, 18-2
 central impact, 72-17 (fig)
 combination, 22-6
 cost, 86-9
 current, 84-2
 design method, 51-5, 51-6
 design method, ACI, 47-18
 filtration, 26-2
 impact, 72-18
 labor, 87-32
 leveling, 78-9, 78-10 (fig)
 material, 87-32
 reduction loan, 87-41 (fig)
 reduction loan, balloon
 payment, 87-42 (fig)
 shear, 66-6
 shear test, 35-25
 tension indicating, 45-13
 tension indicator washer, 58-4 (fig)
 Directed graph, 86-10
 Direction, 78-12
 angle, 5-2, 7-5
 cosine, 5-2, 7-5, 41-2, 41-12
 number, 7-5
 peak flow, 73-5
 -sensing probe, 17-27
 Directional
 derivative, 8-6
 design hour volume, 73-5
 distribution factor, 76-17
 factor, 73-5
 interchange, 73-25
 Directionality factor, 73-5
 Directrix, 7-10
 Disabled parking, 73-23
 Disbenefit, 87-16
 Disbursement, 87-3
 Disc, thermodynamic, steam trap, 16-14
 Discharge, 18-4
 coefficient of, 17-18, 17-30
 coefficient, venturi, 17-30
 from tank, 17-17 (fig)
 line, centrifugal pump, 18-2
 of contract, 88-6
 side, 18-4
 specific, 21-4
 tank, 17-16, 17-17 (fig)
 throttling, 18-18 (fig)
 velocity, 17-17, 21-4
 Discount factor, A-177, A-178
 continuous compounding, 87-28
 discrete compounding, 87-7 (tbl)
 Discounting, 87-5
 Discrete compounding, discount
 factor, 87-7 (tbl)
 Discriminant, 3-3, 7-9
 Discs, method of, 9-6
 Disease, waterborne, 27-10
 Disinfection, 26-20, 28-13
 alternative, 25-10
 by-product, 25-9, 25-10
 Disintegration, 32-13
 pavement, 76-5
 Disjoint, set, 11-1
 Dispersant, 22-24
 Dispersion, 11-13
 relative, 11-13
 test, 35-4
 Displacement, 22-7, 71-3
 double, 22-7
 linear, 71-3
 meter, 17-26
 method, photogrammetry, 78-19
 single, 22-7
 virtual, 46-10
 Disposal
 dilution, G-5
 effluent, 29-13
 facility, 33-2
 sludge, 30-20
 Disposition, hazardous waste, 33-2
 Dissipater, energy, 80-11
 Dissociation
 constant, 22-15
 constant, acid, A-92
 constant, base, A-93
 temperature, 24-15 (ftn)
 Dissolved
 air flotation thickening, 30-14
 metal, in wastewater, 28-14
 organic solids, 29-3
 oxygen, 28-7
 oxygen, in water, A-87
 oxygen sag curve, 28-10
 oxygen standard, 28-10
 solids, 28-6
 solids, total, 26-19 (tbl)
 Distance
 between figures, 7-7
 between points, 7-5, 7-7
 braking, 75-6, 75-7
 clear, 50-8, 50-18
 critical, 17-5
 decision sight, 79-11, G-5
 edge, 65-2
 embedding, 50-23
 freeboard, G-7
 haul, 80-7 (fig)
 measurement, 78-7, 78-8
 measurement, tacheometric, 78-8
 multiplier, 83-7, 83-8
 nonstripping sight, G-10
 passing sight, 79-10, G-11
 semimajor, 7-11
 semiminor, 7-11
 sight, G-13
 skidding, 75-7
 stopping, 75-6
 stopping sight, 75-6, 79-10, G-13
 stopping, 75-6
 traveled, 71-3
 Distillate oil, 24-6
 Distillation, 26-22
 global, 32-12
 temperature, 32-8
 Distorted model, 17-45
 Distortion energy theory, 43-8
 Distributed
 load, 41-5
 load, beam, 41-5 (fig)
 load, cable, 41-18 (fig)
 load, moment, 41-6
 loading, 41-5 (fig)
 Distribution (*see also type*)
 and marketing, sludge, 30-20
 bathtub, 11-9
 beta, 86-14
 binomial, 11-4
 chart, particle size, 35-3, 35-4
 chi-squared, 11-7, A-13
 coefficient, G-5
 continuous, 11-6
 discrete, 11-5
 exponential, 11-6
 factor, 47-13
 factor, directional, 76-17
 factor, lane, 76-17
 frequency, 11-10
 function, continuous, 11-6
 Galton's, 11-8
 Gaussian, 11-6
 gravity, 26-24
 hypergeometric, 11-5
 lane, 73-6
 leptokurtic, 11-14

- log-normal, 11-8
- mesokurtic, 11-14
- multiple hypergeometric, 11-5
- negative exponential, 11-9
- normal, 11-6
- particle size, 35-2
- platykurtic, 11-14
- Poisson, 11-5
- Student's *t*-, 11-7, A-14
- t*-, 11-7, A-14
- velocity, 16-7
- water, 26-24
- Distributive
 - law, 3-3
 - law, matrix, 4-4
 - set, law, 11-2
- Ditch
 - lining fabric, 80-11
 - oxidation, 30-3
- Divergence, 8-7
- Divergent sequence, 3-10
- Diversion
 - chamber, 29-13
 - road, 73-31
- Divided
 - difference, 12-3
 - difference table, 12-3 (ftn)
 - highway, 73-3, G-5
- Division, matrix, 4-4
- DNA, 27-2
- Document, as-built, 86-16
- Documentation, project, 86-16
- Dollars, 87-2
 - constant value, 87-39
- Domain, eminent, G-6
- Domestic
 - sewage, 28-6 (tbl)
 - waste, G-5
 - wastewater, 28-1
- Dominant load, 46-14
- Donnan formula, 31-7
- Door assemblies, fire testing, 82-3
- Dose
 - absorbed, G-1
 - chemical feed, 26-9
 - chlorine, 26-20, 28-13
 - coagulant, 26-9
 - equation, 26-9
 - fluoride, 26-14
 - infective, 27-10
 - noise, 83-8
 - noise, permissible, 83-8 (tbl)
 - radiation absorbed, 6-1 (ftn)
- DOT
 - geotextile specifications, 40-10
- Dot
 - product, 5-3
 - product, vector, 5-3 (fig)
- Double
 - acting hammer, 38-2
 - acting pump, 18-2
 - action shear, 55-3
 - alternate mode operation, 73-19
 - alternate parking, 73-22
 - angle formula, 6-3
 - angle member, 61-8
 - butt, 45-11 (ftn)
 - declining balance, 87-21, 87-26
 - declining balance method, 87-21
 - drainage, 40-5
 - entry bookkeeping, 87-33 (ftn)
 - entry bookkeeping method, 87-33 (ftn)
 - entry bookkeeping system, 87-33
 - integral, 9-3
 - integration method, 44-13
 - liner, 31-3
 - liner system, 31-3
 - meridian distance, 78-17
 - orifice air valve, 16-14
 - pintle tie, 68-16
 - ring infiltration test, 21-9
 - rivet, 45-11 (ftn)
 - root, 3-3
 - seal, 34-16
 - shear, 45-11
 - stage process, 26-16
 - suction pump, 18-4
 - taxation, 88-2
 - vortex, 34-7
 - vortex, single cyclone (inertial separator), 34-7 (fig)
- Doubling time, 3-11, 87-8, 87-9
- interest rate, 87-9 (tbl)
- Doubly reinforced
 - beam parameter, 50-24 (fig)
 - concrete beam, 50-24
 - concrete section, 50-24
 - section design, 50-25
- Dowel, 55-6, 77-7
 - bar, 55-6, 77-12
- Downcycling, 32-13
- Downdrag, 38-6
- Downgrade, specific, highway, 73-12
- Downpull, G-5
- Downstream
 - control, 19-21
 - taper, 73-31, 73-32
- Draft, 20-21
 - force, 26-4
 - gauge, 15-3 (ftn)
 - tube, 18-24
- Drag (*see also type*), 17-41
 - coefficient, 17-41, 17-42 (fig)
 - count, 17-42
 - disk, 17-42
 - filter, 34-5
 - form, 17-41
 - induced, 17-41
 - pressure, 17-41
 - profile, 17-41
 - sphere, 17-42
 - vehicular, 75-3
 - viscous, 72-18
 - wake, 17-41
- Drain
 - down, pavement, 76-5
 - extraction, 31-7
 - relief, 31-7
 - slope, 80-10
 - subgrade, 76-29, 76-30 (fig)
- Drainage
 - blind, G-3
 - coefficient, 31-7, 76-22, 77-6
 - density, G-5
 - double, 40-5
 - netting, 31-3
 - one-way, 40-5
 - pavement, 77-6
 - single, 40-5
 - two-way, 40-5
- Draw bridge, 57-4
- Drawbar
 - pull, 75-4
- Drawdown, G-5
 - curve, G-5
 - well, 21-5
- Drawing
 - diagram, shear and moment, 44-9
 - pictorial, 2-2 (ftn)
- Dredge line, 39-2, G-5
- Drift
 - story, 53-2
 - velocity, 34-8, 34-9
 - velocity, effective, 34-9
- Drilled hole, 60-2
- Drinking water
 - demand, 26-22
 - regulations, A-96
 - standards, 25-6
- Drins, 32-12
- Drive train efficiency, 75-3
- Driver
 - error, 75-9
 - overload, 75-9
 - overload, cause, 75-9 (tbl)
 - population adjustment factor, 73-8
 - population adjustment factor, freeway, 73-9 (tbl)
- Driving
 - dynamometer, 85-13
 - speed, 75-9
 - task, 75-8
 - task hierarchy, 75-9 (fig)
- Drop
 - hammer, 38-2
 - hydraulic, 16-9 (ftn), 19-20 (ftn), 19-26
 - panel, 51-5
 - pressure, steel pipe, A-55
 - spherical, 10-10
- Drum
 - filter, vacuum, 30-18
 - mixer, 76-6
 - wire rope, 45-22
- Dry
 - absorption, 34-17
 - air, composition, 24-8 (tbl)
 - basis, concrete, 49-3
 - condition, 72-6
 - density, 35-7
 - density, maximum, 35-18
 - flue gas loss, 24-16
 - scrubbing, 34-17
 - strength test, 35-3
 - ultra-fine coal, 32-7
 - unit weight at zero air voids, 35-18
 - weather flow, 20-7 (ftn), G-5
- Drying bed, sand, 30-18
- DTI washer, 58-4 (fig)
- Du Nouy
 - ring, 14-11
 - torsion balance, 14-11 (ftn)
- Dual
 - certified steel, 58-6
 - layer filter, 26-13
 - layer, pavement, 77-13
- Duct, sorbent-injection, 24-5
- Ductile
 - brittle transition temperature, 43-15
 - cast-iron pipe, 16-9
 - failure mode, 50-6
 - failure, tensile, type, 43-5 (fig)
 - iron pipe, A-44
 - iron pipe dimensions, A-44, A-45
 - iron pipe, standard pressure classes, A-45
 - material, 43-6
 - material, typical tensile test result, 43-2 (fig)
 - stress-strain curve, 48-9 (fig)
 - transition temperature, 43-15 (tbl)
- Ductility, 43-6, 58-2
 - transition temperature, 43-17
 - weld, 66-4
- Dulong's formula, 24-14
- Dummy
 - activity, 86-13
 - gauge, 85-10
 - joint, 77-11
 - node, 86-11, 86-13
 - unit load method, 46-7, 47-3, 47-4, 47-5
- Dump, 31-2
- Dumping, ocean, sludge, 30-20
- Dumpy level, 78-9
- Duplex pump, 18-2
- Dupuit equation, 21-5, 80-11
- Durability
 - concrete, 49-1
 - factor, 49-1
 - masonry, 67-5
 - pavement, 76-3
- Duration
 - fire fighting, 26-24
 - reference, 83-8
- Dust, 32-7
 - coal, 32-7
 - control, 32-7
 - density, areal, 34-5

- loading, 34-5
 - to-binder ratio, 76-15
 - Duty cycle, 84-14
 - Dye penetrant testing, 82-4
 - Dynamic
 - analysis, 44-8, 47-2
 - balance, 70-2
 - effect allowance, 59-17 (ftn)
 - energy, 16-1 (ftn)
 - equilibrium, 72-5
 - friction, 72-5
 - friction, coefficient, 75-5
 - head, 18-6
 - load allowance, 59-17 (ftn), 74-4
 - load factor, 59-17 (ftn)
 - reaction, 72-5 (ftn)
 - response, 44-8
 - similarity, 17-45
 - viscosity, 14-6 (ftn)
 - Dynamics, 71-1
 - vehicle, 75-2
 - Dynamometer, 85-13
 - brake, 85-13
 - driving, 85-13
 - torsion, 85-13
 - transmission, 85-13
 - Dyne, 1-4, 1-5, A-3
 - Dystrophic, G-5
- E**
- e*
- folding time, 3-11
 - log *p* curve, 35-24
- e*-log *p* curve, 40-3, 40-4
- E. coli*, 27-3, 27-6, 27-8, G-6
- Earplug, NRR, 83-8
- Earth
 - atmosphere, 15-13, 15-14 (ftn)
 - curvature, 78-9
 - handling equipment, 80-9
 - pressure, 37-2
 - pressure coefficient, 37-3, 37-5
 - pressure, active, 37-2, 37-3
 - pressure, Coulomb, 37-3, 37-5
 - pressure, lateral, coefficient of, 38-3
 - pressure, passive, 37-2, 37-4
 - pressure, Rankine, 37-3, 37-5
 - rare, 22-3
- Earthwork, 80-1
 - factor, load, 80-1
 - factor, swell, 80-1
 - measure, 80-1
 - volume, 80-4
- Easement, G-6
 - curve, 79-18
- East declination, 78-12
- Eastern coal, 24-5
- Eccentric
 - connection, 65-1, 65-5, 66-5
 - impact, 72-18 (fig)
 - load, column, 45-4
 - load, connection, 45-18
 - load, footing, 36-9
 - loading, 44-12
 - loading, axial member, 44-12 (fig)
 - plug valve, 16-12
 - shear connection, 65-5, 65-6 (fig)
- Eccentricity, 7-8, 7-11, 7-12, 44-12, 45-4
 - column, 52-3, 52-6
 - column, minimum, 69-3
 - dam, 15-12
 - in plane of faying surface, 66-5 (fig)
 - normal to plane of faying
 - surface, 66-5 (fig)
 - normal to plane of faying surfaces, 66-5
 - normalized, 52-3
 - orbit, 72-21 (tbl)
 - plane of faying surfaces, 66-5
 - torsional, 45-17
- Echelon
 - form, row-reduced, 4-2
 - matrix, 4-1
- Eckert number, 1-9 (tbl)
- Eco-toxicity, 32-13
- Econocrete, 77-12
- Economic
 - analysis, 87-2
 - analysis factor, A-177, A-178
 - analysis process, 75-18
 - analysis, engineering, 87-2
 - analysis, life, 87-4
 - appraisal, HSM, 75-18
 - evaluation, 73-27
 - evaluation, road, 73-27
 - indicator, 87-39
 - life, 87-19, 87-20
 - life analysis, 87-4
 - order quantity, 87-43
- Economical shape, most, 58-6
- Economics, engineering, 87-2 (ftn)
- Economizer, ash, 24-3
- Economy, fuel, 75-4
- Eddy current testing, 43-12
- Edge
 - adsorption, G-1
 - distance, hole, 65-1
 - three-, bearing test, 16-11
- EDM, 78-5, 78-8
- EDTA, 25-4
- Eductor pipe, 21-4
- Effect
 - common ion, 22-13
 - frost, 76-16
 - greenhouse, 32-8
 - impurity on mechanical
 - property, 43-17 (fig)
 - isotope, 22-2 (ftn)
 - Magnus, 17-41
 - of deflection, 62-2
 - P*-delta, 53-1, 62-1
 - Peltier, 85-7 (ftn)
 - photoelectric, 85-4
 - piezoelectric, 15-2, 85-4
 - refraction, 78-9 (fig)
 - second-order, 62-1, 62-2
 - Seebeck, 85-7
 - strain-hardening on mechanical
 - property, 43-17 (fig)
 - stress on creep rate, 43-16 (fig)
 - Thompson, 85-7 (ftn)
 - venturi, 17-29
- Effective
 - annual interest rate, 87-5
 - asphalt content, 76-9
 - drift velocity, 34-9
 - flange width, 50-18 (fig)
 - flange width, AASHTO, 57-2
 - flexural stiffness, 53-4
 - force, 72-5 (ftn)
 - gauge, 79-10
 - grain size, 35-2, 35-23
 - green ratio, 73-15
 - green time, 73-20
 - head, 17-17, 18-6
 - height, masonry column, 69-2
 - interest rate, 87-5, 87-28
 - interest rate per period, 87-28
 - length, 61-3
 - length factor, 53-3, 61-3 (tbl)
 - length factor alignment chart, 61-3 (fig)
 - length factor, wall, 54-2
 - length, column, 45-3, 53-3
 - moment of inertia, 50-16
 - net area, 60-3
 - number of passes, 29-10
 - period, 87-2
 - pile length, 38-3
 - porosity, 21-2
 - pressure, 37-9, 40-5
 - radius of gyration, steel beam, 59-3
 - rate per compounding period, 87-28
- red time, 73-20
- roadbed soil resilient modulus, 76-20
- roadbed soil resilient modulus estimation
 - chart, 76-21 (fig)
- slab support *k*-value, 77-6
- slab support modulus, 77-6 (tbl)
- slab support modulus, cement-threaded
 - subbase, 77-6 (tbl)
- slab width, composite member, 57-2
- specific gravity, 76-9, G-6
- stress, 35-14, 35-27, 37-9, 40-5
- subbase modulus, 77-6 (tbl)
- throat size, 45-14
- throat thickness, 45-14
- value, 84-4
- velocity, 21-3
- walkway width, 73-21
- weld size, minimum, 66-9
- weld throat, 45-14
- width, 19-11, 50-18, 64-2
- width, concrete slab, 64-2
- Effectiveness
 - cost-, method, 75-19
 - index, cost-, 75-19
 - lever, 15-16
- Efficiency, 13-6
 - boiler, 24-16
 - collection, 26-6, 26-7, 34-9
 - combustion, 24-16
 - compressor, 30-9
 - destruction removal, 34-13
 - drive train, 75-3
 - electrostatic precipitator, 34-9
 - energy-production, 13-6
 - energy-use, 13-6
 - furnace, 24-16
 - isentropic, 30-9
 - joint, 16-10, 45-12
 - lever, 15-16
 - motor, 84-17
 - overall, pump, 18-9
 - oxygen transfer, 30-9
 - pile group, 38-5
 - pulley, 41-11
 - pump, 18-9
 - pumping (temperature), 18-20
 - removal, 30-13, 34-7
 - sedimentation, 26-6
 - thermal, 24-16
 - treatment, 30-6
 - volumetric, 18-3
 - wire-to-water, 18-9
- Efficient cross section, 19-9
- Effluent, G-6
 - disposal, 29-13
 - stream, G-6
- Efflux, speed of, 17-17
- Effort, 41-11
 - tractive, 75-3
- Egg digester, 30-16
- Eigenvalue, 4-8
- Eigenvector, 4-8
- EIR, 32-3
- EJCDC, 88-5 (ftn)
 - pump, 18-2
- Ejector
- Elastic
 - analysis, 45-17 (ftn)
 - beam deflection equations, A-120,
 - A-121, A-122, A-123
 - buckling, 61-4
 - constant, 43-9
 - constant, relationship, 43-9
 - deflection, beam, A-120, A-121,
 - A-122, A-123
 - deformation, 44-2, 46-2
 - design, steel, 59-8
 - failure, 44-19
 - fixed-end moments, A-126, A-127
 - impact, 72-17
 - limit, 43-3
 - line, 44-14

- method, 66-5, 66-8
- modulus, 43-2
- region, 43-3, 48-9
- second-order analysis, 53-1
- settling, 40-3
- strain, 43-3
- toughness, 43-7
- Elasticity
 - modulus of, 43-2, 43-4, 44-2, 58-2, 67-6
- Electric
 - charge, 84-2
 - machine, 84-16
 - motor size, 18-10
- Electrical
 - conductivity, water, 25-11
 - current, effect on humans, 83-6 (tbl), 83-7 (tbl)
 - plant, hydroelectric, 18-23, 18-24
 - protection, rebar, 48-10
 - safety, 83-6 (tbl), 83-7 (tbl)
 - shock, 83-6, 83-7
 - unit conversion, A-1, A-2
- Electricity cost, 18-9
- Electrode, 66-1
- Electrodialysis, 26-22
- Electrodeposition, 66-2
- Electromagnetic flowmeter, 17-27
- Electromotive force, 84-2
- Electronegative element, 22-2
- Electronegativity, 22-2
- Electronic distance measurement, 78-5, 78-8
- Electroslag welding, 66-2
- Electrostatic
 - precipitator, 34-8
 - precipitator design parameter, 34-8 (tbl)
 - precipitator, efficiency, 34-9
 - unit, 84-2
- Element (structural), 22-2, G-6
 - atomic numbers and weights, A-83
 - bimetallic, 44-4
 - building, fire resistance, 82-6
 - electronegative, 22-2
 - fixed, 73-3
 - horizontal curve, 79-2 (fig)
 - intersection, 73-14 (fig)
 - matrix, 4-1
 - negative, 85-7
 - positive, 85-7
 - properties, A-83
 - roadway network, 75-15
 - set, 11-1
 - stiffened, 61-6
 - transition, 22-3
 - type, 22-2
 - unstiffened, 61-6
- Element, roadway, 75-15
- Elementary row operation, 4-2
- Elements, periodic table of the, A-84
- Elevation, 2-2
 - angle, 6-2
 - drawing, 2-2 (ftn)
 - equilibrium, 79-10
 - measurement, 78-9, 78-10, 78-11
 - surveying, 78-9
- Elimination, Gauss-Jordan, 4-2
- Ellipse, 7-11
 - degenerative, 7-11
 - equation, 31-7
 - formula, A-7
- Elliptic integral function, 9-8 (ftn)
- Elongation, 46-2 (ftn)
 - at failure, percent, 43-6
 - percent, 43-6
- Elutriation, G-6
- Elutriator, G-6
- Embankment, G-6
 - fill, 40-9, 80-2
- Embedment
 - distance, 50-23
 - length, masonry, 67-6
- Embrittlement
 - caustic, 22-20
 - hydrogen, 22-20
- Eminent
 - domain, G-6
- Emission
 - fugitive, 32-8, 34-16
 - rate, lowest achievable, 34-2
- Empirical
 - Bayes adjustment, 75-17
 - design, concrete deck, 51-8
 - formula, 22-6
- Employer, dealing with, 89-2
- Emulsified, asphalt, 76-2
- Emulsion, 22-11 (ftn), G-6
 - asphalt, G-2
- Encroachment, G-6
 - lane, 79-20
- End
 - built-in, 46-7
 - cable, 41-20
 - condition coefficient, 61-3
 - fixed, 46-7
 - moment, amplified, 53-5
 - of-pipe treatment, 32-1
 - plate construction, 65-8 (fig)
 - point, titration, 25-2
 - post, 41-12
 - product, waste decomposition, 27-10 (tbl)
 - restraint coefficient, 45-3 (tbl)
 - restraint factor, 61-3
 - slope rounding, 81-4
- Endocytosis, 27-3
- Endoergic impact, 72-17
- Endogenous decay, 28-7
 - coefficient, 28-7, 30-7
- Endoplasmic reticulum, 27-2
- Endosulfan, 32-12
- Endothermic reaction, 22-18
- Endpoint pressure-drop, 22-23
- Endrin, 32-12
- Endurance
 - limit, 43-9
 - ratio, 43-9
 - strength, 43-9, 43-10
 - strength, surface finish reduction factor, 43-11 (fig)
- Energy, 13-1
 - change, 47-3
 - conservation law, 13-1
 - conservation of, 16-1
 - conversion, SI, A-3
 - dissipater, 80-11
 - dynamic, 16-1 (ftn)
 - efficiency ratio, 13-6 (ftn)
 - equation, steady-flow, 16-2
 - falling mass, 13-3
 - flow, 13-3, 16-2 (ftn)
 - grade line, 16-8, 17-15
 - gradient, 19-3, G-6
 - gravitational, 13-3, 16-1, 16-2 (ftn)
 - impact, 16-4
 - internal, 13-4
 - kinetic, 1-3, 1-4, 13-3, 16-1
 - kinetic, specific, 16-1, 16-2
 - line, 16-8 (ftn)
 - lost in a jump, 19-24
 - method, 47-3
 - p*-*V*, 13-3, 13-4
 - potential, 1-3, 13-3, 16-2
 - pressure, 13-3, 16-2
 - production efficiency, 13-6
 - sink, 17-15
 - source, 17-15
 - specific, 13-1, 16-1, 16-9, 19-15
 - spring, 13-3
 - stagnation, 16-4
 - static, 13-3, 16-2 (ftn)
 - strain, 43-6, 43-7, 44-2, 44-12
 - strain, method, truss deflection, 44-17
 - tapered, 26-12
 - total, 16-2, 16-4
 - use efficiency, 13-6
 - velocity, 16-1 (ftn)
 - work principle, 13-3, 13-4
- Engineer
 - consulting, 90-1
 - intern, 90-1 (ftn)
 - In-Training exam, 90-1
 - professional, 90-1
 - registered, 90-1
- Engineer's
 - chain, 78-7
 - level, 78-9
 - transit, 78-12
- Engineering
 - dimensional system, 1-7
 - economic analysis, 87-2
 - economics, 87-2 (ftn)
 - economy, 87-2 (ftn)
 - economy factor, A-177, A-178
 - environmental, 32-3
 - intern, 90-1 (ftn)
 - licensing, 90-1
 - material, type, 43-2 (fig)
 - mechanics, 41-1
 - News Record equation, 38-2
 - registration, 90-1
 - strain, 43-2
 - stress, 43-2
 - value, 86-2
- Engineers
 - dealing with, 89-3
 - Joint Contracts Documents Committee, 88-5 (ftn)
- Engineers' Creed, 89-1
- English
 - engineering system, 1-2
 - gravitational system, 1-3
- Enlargement, 17-12
 - sudden, 17-12, 17-13
- ENR equation, 38-2
- Enteric, G-6
- Enterovirus, 27-6
- Enthalpy
 - of formation, 22-17, 22-18
 - of reaction, 22-18
- Entrained
 - air-, 77-3
 - concrete, air-, 77-3
- Entrance
 - loss coefficient, minor, 19-28 (tbl)
 - loss, culvert, 17-20 (tbl)
 - pipe, 17-13
 - spiral, 79-18
- Entry matrix, 4-1
- Envelope
 - failure, 35-26
 - maximum shear, 47-20
 - shear, 50-20
- Environment, 32-2
- Environmental
 - engineering, 32-3
 - impact report, 32-3
 - protection, ethics, 89-4
 - enzyme, 27-4, G-6
- Ephemeral stream, G-6
- Epicycloid, 7-4
- Epidemic, 10-10
- Epilimnion, G-6
- Epoxy
 - coal tar, 16-11
 - coated rebar, 48-10
 - coated wire, 67-7
 - coating factor, 55-5
 - pipe coating, 16-11
- Equal
 - angle, 61-1
 - tangent parabola, 79-11
 - vectors, 5-1
- Equality of matrices, 4-4
- Equalization flow, 29-3, 34-23

- Equation, 3-2
 algebraic, 3-2
 American Insurance Association, 26-24
 Andrade's, 43-16
 Antoine, 14-10 (ftn)
 auxiliary, 10-1
 Bernoulli, 16-2, 19-7
 Bessel, 10-5
 Blasius, 17-5
 Boussinesq's, 40-1
 Camp, 29-6
 Cauchy, 10-5
 characteristic, 4-8, 10-1
 Chezy, 19-4
 Chezy-Manning, 19-4
 Clausius-Clapeyron, 14-10 (ftn)
 Colding, 31-7
 Colebrook, 17-5, 17-6
 complementary, 10-1
 complete isothermal flow, 17-10
 continuity, 17-3
 Coulomb's, 35-26
 Darcy, 17-6, 17-8
 Darcy-Weisbach, 17-6, 17-7
 Davis, 75-5
 Davis, modified, 75-5
 Deutsch-Anderson, 34-9
 differential, 10-1
 Donnan, 31-7
 dose, 26-9
 Dupuit, 21-5, 80-11
 ellipse, 31-7
 Engineering News Record, 38-2
 ENR, 38-2
 Euler's, 3-8, 10-5
 extended Bernoulli, 17-15
 first-order, 10-1
 Francis weir, 19-11
 Gauss' hypergeometric, 10-5
 Hagen-Poiseuille, 17-7
 Hazen-Williams, 17-8
 Hazen's, 35-23
 Henderson-Hasselbach, 27-3
 homogeneous, 3-7
 homogeneous differential, 10-1, 10-2
 Horton, 19-13, 21-9
 Horton-Einstein, 19-10
 interaction, 62-2
 Jacob's, 21-7
 Karman-Nikuradse, 17-5
 layer-thickness, 76-22
 Legendre, 10-5
 linear, 3-6, 3-7
 linear differential, 10-1
 Lloyd-Davies, 20-14 (ftn)
 logistic, 27-4
 Manning, 19-4
 Manning, nomograph, A-74
 Mohr-Coulomb, 35-26 (ftn)
 Monod's, 28-6
 Nikuradse, 17-5
 nonhomogeneous, 3-7
 nonhomogeneous differential, 10-1, 10-3
 nonlinear, 10-1
 nonparametric, 3-3
 NRC, 29-10
 NRCS lag, 20-4
 O'Connor and Dobbins, 28-7
 of condition, 46-1
 parametric, 3-2
 quadratic, 3-3, 7-9
 rational, 20-14
 reduced, 10-1
 Refutas, 14-16
 Rehbock weir, 19-11
 Rohsenow, 14-11
 Schaake, Geyer, and Knapp, 20-14
 SCS lag, 20-11
 second-order, 10-1
 simultaneous linear, 3-6, 3-7
 steady-flow energy, 16-2
 Streeter-Phelps, 28-10
 Swamee-Jain, 17-6
 tension field action, 63-3
 Terzaghi-Meyerhof, 36-3
 Theis, 21-7
 Thiem, 21-6
 three-moment, 46-5
 Torricelli, 17-17
 Velz, 29-11
 water balance, 20-2
 water budget, 20-2
 Weisbach, 17-6, 17-7
 Zuber, 14-11
 Equiangular rosette, 85-12
 Equilateral hyperbola, 7-12
 Equilibrium, 72-2
 charge, 34-9
 chemical, 22-13, 22-14
 condition, 41-6
 condition, force system, 41-6 (tbl)
 constant, 22-15
 dynamic, 72-5
 elevation, 79-10
 isopiestic, 14-10 (ftn)
 method, beam, 47-17
 neutral, 72-2
 phase, 72-6
 simulated, 72-5 (ftn)
 stable, 72-2
 static, 15-18, 41-6 (ftn)
 three-dimensional, 41-21
 unstable, 72-2
 Equipment
 angle measurement, 78-12
 compaction, 35-19 (fig)
 earth-handling, 80-9
 rolling, 76-8
 Equipotential line, 17-3, 21-7
 Equity, 87-35
 Equivalence, economic, 87-5
 Equivalency
 factor, axle load, flexible
 pavement, A-166, A-167, A-168
 factor, axle load, rigid
 pavement, A-169, A-170, A-171
 Equivalent, 22-5
 annual cost, 87-16
 axial compression method, 62-2
 CaCO₃, 22-20
 centrifuge, kerosene, 76-14
 chemical, 22-5
 diameter, 16-6 (ftn) (tbl), 17-43
 factor, A-177, A-178
 fluid density, 37-9
 fluid height, 15-5 (tbl)
 fluid pressure, 37-9
 fluid weight, 37-9
 frame method, 51-5
 hydrostatic pressure, 37-9
 investment, life of, 87-39 (ftn)
 Joule, 13-1
 length, 17-12
 length, straight pipe, fittings, A-56
 pressure, 37-9
 resultant force, 41-4
 single-axle load, 76-16
 spring constant, 45-20
 truck/bus/RV, 73-7
 uniform annual cost, 87-7, 87-16
 vector, 5-1 (ftn)
 vehicle, 73-7
 weight, 22-5, G-6
 weight, milligram, 22-11
 Equivalents
 calcium carbonate, A-85, A-86
 population, 28-3
 velocity, 21-3
 water chemistry, A-85, A-86
 Erf, 9-9
 Erg, 1-5, A-3
 Erodible channel, 19-26
 side-slope, 19-26
 velocity, 19-26
 Erosion
 check, 80-11
 control, 80-10
 control fabric, 80-11
 corrosion, 22-19
 Error, 11-11
 accidental, 85-2
 analysis, 78-2
 computed quantity, 78-4
 driver, 75-9
 false positive, 11-14
 fixed, 85-2
 function, 9-9, 11-8, A-15
 function values for positive x values,
 A-15
 function, complementary, 11-8, A-15
 limits range, 85-7
 magnitude, 85-2, 85-3
 of the mean, probable, 78-2
 order of, 78-4
 probable, 78-2
 product, 78-4
 standard, 11-13
 straight line, 45-20 (ftn)
 sum, 78-4
 terms, 85-3 (tbl)
 type, 85-2
 type I, 11-14
 type II, 11-15
 Errors and omissions insurance, 88-8
 ESAL, 76-16, 76-17
 18-kip, 76-20
 Escape velocity, 72-21
 Escarpment, G-6
 Escherichia coli, 27-3
 Escherichiae coli (*see also* E. coli), G-6
 Escort vehicle, 74-3
 ESP
 collection efficiency, 34-9
 design parameter, 34-10 (tbl)
 power density, 34-10
 removal efficiency, 34-9
 tubular, 34-8 (ftn)
 Espey
 10-minute unit hydrograph, 20-13
 conveyance factors, 20-12
 method, 20-12
 synthetic unit hydrograph, 20-12
 Ester, 23-1 (tbl), 23-3 (tbl)
 Estimate, precise, 85-2
 Estimating
 cost, 86-3
 parameter method, 86-6
 Estimation, crash, 75-16
 Estimator, 86-3
 unbiased, 11-12, 11-13
 Estuary, G-6
 Ethanol, 24-7
 Ether, 23-1 (tbl), 23-3 (tbl)
 Ethical priority, 89-2
 Ethics, 89-1
 code of, 89-1
 Ethyl alcohol, 24-7
 EUAC versus age at retirement, 87-19 (fig)
 Eukaryote, 27-1
 Euler
 buckling, 61-2
 buckling load, 53-5
 buckling load theory, 61-2
 load, 45-2, 61-2
 number, 1-9 (tbl)
 stress, 45-3
 Euler's
 constant, 9-9
 curve, 45-3
 equation, 3-8, 10-5
 equation of motion, 72-10
 European method, distance
 measurement, 78-8
 Eutrophic, G-6
 Eutrophication, 25-7, G-6

- Evaluation
 - economic, 73-27
 - live-load factor, 74-4
 - nondestructive, 43-12
- Evaporation, 10-10
 - pan, 20-22
 - reservoir, 20-22
- Evaporite, G-6
- Evapotranspiration, G-6
- Even symmetry, 9-7 (tbl)
 - curve, 7-4
- Event, 11-3, 86-11
 - dependent, 11-3
 - independent, 11-3
 - numerical, 11-4
 - sample space, 11-3
- Exact first-order, 10-3
- Exaggeration, vertical, 78-21
- Exam
 - date, 90-3
 - engineering, professional, 90-1
 - Fundamentals of Engineering, 90-1
 - licensing, 90-1, 90-2
- Examination
 - date, 90-3
 - licensing, 90-1, 90-2
- Excavation, 39-1, 80-2, 83-3
 - by soil type, 83-5 (fig)
 - common, 80-2
 - cost, 80-9
 - height, critical, 39-3
 - layered soil, 83-6 (fig)
 - rock, 80-2
 - safety, 83-3
 - toe, 39-2
- Exceedance
 - ratio, 11-12
- Excess
 - air, 22-9, 24-12
 - air, in concrete, 49-3
 - capacity, 87-32
 - expected average crash frequency, 75-17
 - kurtosis, 11-14
 - spherical, 6-6
 - value, 75-17
 - water, in concrete, 49-3
- Exchange ion, process, 22-22
- Excitation, motor, 84-15
- Exemplary damages, 88-7
- Exemption, industrial, 90-1
- Exertion, BOD, 28-9
- Exfoliation, 22-18, 22-19
- Exhaustion, premature, 29-13
- Exit
 - centrifugal pump, 18-2
 - high-speed, 73-31
 - pipe, 17-13
 - spiral, 79-18
- Exocytosis, 27-3
- Exoergic impact, 72-17 (ftn)
- Exothermic
 - reaction, 22-18
- Expansion
 - by cofactors, 4-3
 - factor, 17-32 (fig)
 - joint, 77-12
 - linear, coefficient, 44-3, 44-4
 - series, 8-8
 - thermal coefficient of, 14-13 (ftn), 44-4
 - volumetric, coefficient, 44-4
- Expected
 - average crash frequency, 75-17
 - value, 11-8, 78-2, 87-30
- Expense, 87-32
 - account, 87-37 (ftn)
 - administrative, 87-33
 - artificial, 87-20
 - classification, typical, 87-34 (tbl)
 - general, selling, and
 - administrative, 87-32
 - marketing, 87-33
 - selling, 87-33
- Expensing the asset, 87-20
- Experiment
 - accuracy, 11-11
 - insensitivity, 11-12
 - precision, 11-11
 - reliability, 11-12
 - stability, 11-12
- Explement angle, 78-13
- Explosive power, ton of, 1-7
- Exponent, 3-5
 - polytropic, 15-14
 - rule, 3-5
 - strain-hardening, 43-5
- Exponential
 - decay, 10-9
 - distribution, 11-6, 11-9
 - distribution, negative, 11-9
 - form, 3-7, 3-8
 - function, integral, 9-9
 - gradient factor, 87-26
 - gradient series cash flow, 87-4
 - growth, 3-11, 10-9
 - growth curve, bounded, 27-4
 - growth phase, 27-4
 - growth rate, 87-4
 - reliability, 11-9
- Exponentially
 - decreasing cash flow, 87-26
 - weighted forecast, 87-42
- Exposed
 - fraction, 15-16
 - surface area, reaction, 22-13
- Exposure, 48-10
 - category, 48-10
 - factor, 26-24
 - highway safety, 75-16
 - level, noise, 83-8 (tbl)
 - limit, permissible, 83-8
 - time, particle, 34-8, 34-9
- Exsec function, 6-4
- Exsecant, 6-4
- Extended
 - aeration, 30-2
 - Bernoulli equation, 17-15
- Extending screed, 76-7
- Exterior span moment
 - distribution, 51-7 (tbl)
- External
 - force, 41-2, 72-2
 - friction angle, 37-3, 37-4 (tbl), 37-5
 - investment, 87-13
 - pressure, 15-15
 - rate of return, 87-12
 - work, 13-2
- Extra-flexible hoisting rope, 45-21
- Extraction
 - drain, 31-7
 - method, 76-9
 - vacuum, 34-22
 - well, gas, 31-6
- Extraneous root, 3-4
- Extrema point, 8-2
- Extreme
 - fiber, 42-7, 44-11
 - fiber stress, 44-11
 - operating point, 18-18
 - point, 8-2
 - shear stress, 44-6
 - tension steel, 50-5
- Extrusive igneous rock, 35-32
- Eyebar
 - assembly, 60-7 (fig)
 - bridge, 60-7
 - design, 60-7
- Eötvös number, 1-9 (tbl), 17-45
- F**
- F**
 - shape barrier, 75-13
 - waste, 32-2
- FAA formula, 20-4
- Fabric
 - ditch lining, 80-11
 - erosion control, 80-11
 - loading, 34-5
 - nonwoven, 40-10
 - reinforcing, 40-10
 - woven, 40-10
- Face
 - angle, 6-6
 - brick, 67-2
 - shell mortar bedding, 68-4
 - value, bond, 87-29
 - velocity, 21-4, 34-5
- Facilitated diffusion, 27-3
- Facility
 - data, 75-15
 - disposal, 33-2
 - material recovery, 31-11
 - storage, 33-2
 - terminology, 73-2
 - transportation, 75-15
 - treatment, 33-2
 - waste-to-energy, 31-10
- Factor (*see also type*)
 - absorption, 34-21
 - adhesion, 38-3
 - base plate cantilever, 61-10
 - bearing capacity, 36-3, 36-4 (tbl)
 - behavior, 73-9
 - bioaccumulation, G-3
 - bioconcentration, G-3
 - biomagnification, G-3
 - bolt torque, 45-13
 - bulking, 80-1
 - calibration, 75-16
 - capacity reduction, 45-2, 50-5
 - carryover, 47-14
 - cash flow, 87-6, A-177, A-178
 - cement, 49-2
 - centrifugal, 79-7
 - compaction, 31-3
 - compressibility, 14-13 (ftn)
 - condition, 74-4
 - conversion, A-1, A-2
 - conveyance, open
 - channel, A-77, A-78, A-79, A-80
 - conveyance, trapezoidal
 - channel, A-77, A-78
 - crash, 75-8
 - crash modification, 75-16
 - Cunningham correction, 34-9
 - Cunningham slip, 34-9
 - Darcy friction, 17-5, A-51, A-52, A-53, A-54
 - dead load, 74-4
 - directional, 73-5
 - directional distribution, 76-17
 - directionality, 73-5
 - discount, 87-7 (tbl)
 - distribution, 47-13
 - driver population adjustment, 73-8
 - durability, 49-1
 - economic analysis, A-177, A-178
 - effective length, 53-3, 61-3 (tbl)
 - effective length, wall, 54-2
 - end-restraint, 61-3
 - environmental, 75-8
 - epoxy coating, 55-5
 - evaluation live-load, 74-4
 - expansion, 17-32 (fig)
 - exponential gradient, 87-26
 - familiarity, 73-9
 - fatigue notch, 43-10
 - fatigue stress concentration, 43-10
 - filler, 65-3
 - flexural amplification, 62-2
 - flow, 17-14
 - friction, 77-7
 - friction, pavement, 77-10 (fig)
 - gage, 85-8, 85-9
 - growth, 76-17

- growth projection, 76-17
 Harmon's peaking, 28-2
 heavy vehicle, 73-8
 human, 75-8
 impact, 16-4, 40-9
 in crash, bicyclist, 75-10
 in crash, intersection, 75-10
 in crash, pedestrian, 75-10
 in crash, roadway segment, 75-10
 instrument, 78-8
 integrating, 10-2
 irreducible, 87-2
 joint quality, 16-10
 judgment, 87-2
 lane and shoulder adjustment, 73-13
 lane distribution, 76-17, 76-18 (tbl)
 lateral torsional buckling, 59-4
 lightweight aggregate, 50-16, 55-2, 55-5
 live-load, 74-4
 load (haulage), 40-9, 50-3, 80-1
 load equivalency, 76-17
 load, bedding, 40-9
 loading, 31-3
 long-term deflection, 56-3
 Meyerhof, 36-3, 36-4 (tbl)
 moment, 59-4
 moment amplification, 62-1
 nonquantifiable, 87-2
 nonquantitative, 87-2
 nut, 45-13
 of safety, overturning, 15-12
 of safety, sliding, 15-12
 overload, 45-2
 peak hour, 73-5
 peaking, 28-2
 phase, 84-7
 pipe, 16-8
 piping geometry, 17-14
 plastification, web, 63-6, 63-7
 power, 84-7, 84-9
 reinforcement location, 55-5
 reinforcement size, 55-5
 resistance, 74-4
 Reynolds number, 17-14
 roadway, 75-8
 section, 19-3
 separation, 34-8
 service, 72-7 (ftn), 84-13
 shape, 35-23, 36-3
 side friction, 38-3, 72-8, 79-7
 single payment present worth, 87-5
 sinking fund, 87-7
 size, 55-5
 slenderness, reduction, 68-7
 stability correlation, 76-12 (tbl)
 stadia interval, 78-8
 standard cash flow, A-177
 stiffness reduction, axial load, 53-4
 stiffness reduction, lateral load, 53-4
 strain sensitivity, 85-8
 strength reduction, 50-5
 stress concentration, 44-5
 stress concentration, press fit, 45-9
 stripping, 34-21
 surface area, 76-6
 surface finish, 43-10
 swell, 80-1
 system, 74-4
 T- (truck), 73-8
 table, economic analysis, A-177, A-178
 Terzaghi, 36-3 (tbl)
 time, 40-5
 transverse sensitivity, 85-9
 truck, 76-17
 utilization, 73-28
 vehicle, 75-8
 velocity of approach, 17-29
 Vesic, 36-3, 36-4 (tbl)
 wall shear stress, 17-5 (ftn)
 weighting, 87-42
 yield, 27-12
- Factored
 load, 50-3
 moment, slab beam, 51-6
 Factorial, 3-2
 Factoring, polynomial, 3-4
 Factory, cost, 87-33, 87-36
 Facultative, G-6
 bacteria, 27-6
 heterotroph, 27-8
 pond, 29-4
 Failure, 11-3
 base circle, 40-7
 block shear, 60-4 (fig)
 brittle, 43-14, 50-5
 conditional probability of, 11-9
 cup-and-cone, 43-5
 ductile, mode, 50-6
 energy versus temperature, 43-16 (fig)
 envelope, 35-26
 fatigue, 43-9
 fracture, 74-1
 line, 35-26
 mean time before, 11-9 (ftn)
 mean time to, 11-9
 mode, steel beam, 59-4
 probability, 11-3
 shear, soil, 36-2
 slope circle, 40-7
 soil, 35-26
 toe circle, 40-7
 vener, 31-5
 Faith of an Engineer, 89-1 (ftn)
 Fall
 arrest system, 83-7
 protection, 83-7, 83-9
 Falling
 -head test, 35-23
 limb, 20-7
 mass energy, 13-3
 weight deflectometer, 76-16
 False
 position method, 12-2 (ftn)
 positive error, 11-14
 Familiarity factor, 73-9
 Family
 chemical, 22-2
 organic compound, 23-1, 23-2, 23-3
 Fan brake, 85-13
 Fanning friction factor, 17-5 (ftn)
 Faraday, 84-2, A-1, A-2
 Faraday's law of induction, 17-27
 Fast
 Fourier transform, 9-8
 track pavement, 76-29
 tracking, 86-9
 Fastener, 45-9, 65-1
 allowable, 65-3
 available load, 65-3
 critical, 45-18
 stress, static loading, 65-3 (tbl)
 tension connection, 65-6 (fig)
 Fatigue
 corrosion, 22-20
 damage value, relative, 76-20
 failure, 43-9
 life, 43-9
 limit state, 74-4 (ftn)
 loading, 58-5
 low-cycle, 43-9
 notch factor, 43-10
 notch sensitivity, 43-10
 ratio, 43-9
 resistance, pavement, 76-4
 strength, 43-9
 stress concentration factor, 43-10, 44-5
 test, 43-9
 Fatty acid, 23-2 (tbl), 27-9
 Faulting, pavement, 76-5
 Faying surface, 22-20, 65-3
 Fecal coliform, 27-8, G-6
 Fee
 fixed, cost plus, 88-5
 lump-sum, 88-5
 per diem, 88-5
 percentage of construction cost, 88-5
 projection, 86-2
 retainer, 88-5
 salary plus, 88-5
 structure, 88-5
 Feedwater boiler, 22-23
 Feldspar, 35-32
 Fence, silt, 80-11
 Fenvalerate, 32-12
 Fermentation, 27-9
 Ferritic stainless steel, 22-19 (ftn)
 Ferrous alloy, true and engineering stress
 and strain, 43-6 (fig)
 Ferrule, ceramic, 64-4
 FFS, 73-9
 FFT, 9-8
 analyzer, 9-8
 Fiber
 core wire rope, 45-21
 extreme, 42-7
 -reinforced concrete, 48-3, 48-7
 -reinforced concrete, steel, 77-13
 Fiberglass, 32-4
 Fiduciary responsibility, 88-3
 Field
 capacity, 31-7
 condition, crash, 75-18
 condition, transportation, 75-15
 density test, 35-21
 inverse-square attractive, 72-19
 inverse-square repulsive, 72-19
 File hardness, 43-13
 Fill, 80-2
 and cut, 80-2
 broad, 40-9
 embankment, 40-9
 Filled metal deck, 57-4
 Filler
 factor, 65-3
 metal, 58-4, 66-1
 mineral, 76-3
 Fillet weld, 45-14, 66-2, 66-3 (fig), 66-9
 size, minimum, 66-3 (tbl)
 Film coefficient, 30-17
 Filming amine, 22-23
 Filter
 backwashing, 26-13
 berm, 32-14
 biofilm, 26-14
 biological, 29-8
 cake, 30-20
 chamber, 32-14
 cloth, 40-10, 80-11
 drag, 34-5
 drag model, 34-5
 dual-layer, 26-13
 fixed media, 29-8
 fly, 29-8
 high-rate, 29-8
 low-rate, 29-8
 multi-layer, 26-13
 multi-media, 26-13
 others, 26-14
 polishing, 29-12
 porous, 21-5
 press, belt, 30-18
 press, recessed plate, 30-18
 pressure, 26-14
 ratio, 34-5
 resistance, 34-5
 roughing, 29-9
 sand, 26-13, 29-12
 sand, bed, 32-14
 sand, rapid, 26-13
 sand, slow, 26-14
 specific area, 29-9
 standard-rate, 29-8
 super high-rate, 29-9
 trickling, 29-8

- two-stage trickling, 29-10
- vacuum drum, 30-18
- Filtering velocity, 34-5
- Filtration, 26-13
 - complete, 26-2
 - conventional, 26-2
 - direct, 26-2
 - in-line, 26-2
 - pressure, 30-18
 - time, 34-6
- Final
 - clarifier, 29-12, 30-4
 - clarifier, characteristics, 30-5
 - cover, 31-5
- Financing cost, 86-5
- Fine
 - aggregate, 48-2, 49-2, 76-3
 - screen, wastewater, 29-6
- Fineness modulus, 48-2
- Fines, 24-4, 35-3, G-6
 - fraction, 35-3
- Finish surface, 2-4, 43-10, 43-11 (fig)
 - steel, 65-3
- Finite series, 3-11
- Fire
 - fighting demand, 26-23
 - fighting duration, 26-24
 - flow, 26-23
 - flow, basic, 26-23
 - flow, ISO, 26-23
 - flow, needed, 26-23
 - hydrant, 26-24
 - resistance standard, 82-5
 - resistivity, 82-4
 - testing, door assemblies, 82-3
- First
 - area moment, 42-2
 - derivative, 8-1
 - flush, 32-14
 - in, first-out method, 87-38
 - law of cosines, 6-6
 - law of thermodynamics, 13-2 (ftn)
 - moment of a function, 9-6
 - moment of area, 42-2, 46-5
 - order analysis, 53-1
 - order analysis, linear elastic, 47-2
 - order differential equation, 10-1
 - order, exact, 10-3
 - order, linear, 10-2
 - order, survey accuracy, 78-4
 - stage demand, G-6
- Fish, toxic effects on, 25-8
- Fisher's
 - kurtosis, 11-14
 - skewness, 11-14
- Fission, binary, 27-8, G-3
- Fit
 - interference, 45-6
 - press, 45-6
 - shrink, 45-6
- Fitting, 17-12
 - screwed, 17-12 (ftn)
 - threaded, 17-12 (ftn)
- Fittings, equivalent length of straight
 - pipe, A-56
- Fixation, nitrogen, G-10
- Fixed
 - angle jib, 83-9, 83-10
 - asset, 87-35
 - axis, rotation, 72-2
 - base method, 20-7
 - carbon, 24-4
 - cost, 86-9, 87-32
 - dissolved solids, 25-9
 - element, 73-3
 - end, 46-7
 - end beam, 46-1, 46-7
 - end moment, 46-7, A-126, A-127
 - end moment, elastic, A-126, A-127
 - error, 85-2
 - flux, 26-22 (ftn)
 - jib, 83-9, 83-10
 - media filter, 29-8
 - percentage of book value, 87-21 (ftn)
 - percentage on diminishing balance
 - method, 87-21 (ftn)
 - point iteration, 12-2
 - pulley, 41-11
 - solids, 30-4
 - suspended solids, 25-9
 - time controller, 73-19
 - time cycle, 73-19
 - vector, 5-1 (ftn)
- Fixity, 61-3
- Flagella, 27-2, 27-8
- Flagellate, 27-8
- Flagellated protozoa, 27-8
- Flame temperature, 24-15
 - peak, 32-10
- Flange, 42-4
 - design, 63-2
 - plate girder, 63-2, 63-3
 - stiffener, 44-19, 59-18 (fig)
 - strength, 63-3
 - width, effective, 50-18 (fig)
 - width, effective, AASHTO, 57-2
- Flanged beam, web, 44-10 (fig)
- Flap, 17-40
- Flare, 31-6, 34-15
 - curb, 79-5
 - parabolic, 79-5
- Flash
 - mixer, 26-10
 - point, 24-5 (ftn)
 - set, 49-6
- Flashover, 34-9
- Flat
 - belt friction, 72-7 (fig)
 - friction, 72-5
 - plate, 45-19, 51-5
 - plate, uniform pressure, 45-20 (tbl)
 - slab, 51-5
- Flatworm, 27-8
- Flexibility
 - coefficient, 47-8
 - method, 47-3, 47-7
 - pavement, 76-3
- Flexible
 - bulkhead, 39-4
 - connection, 65-7
 - diaphragm, 68-12
 - membrane liner, 31-3, 31-4
 - pavement, 76-10, 76-29, G-6
 - pavement design nomograph, AASHTO, 76-23 (fig)
 - pavement structural design, 76-15
 - pavement, axle load equivalency
 - factor, A-166, A-167, A-168
 - pavement, design, AASHTO
 - method, 76-19
 - pavement, minimum
 - thickness, 76-22, 76-25
 - pipe, 40-9
- Flexural
 - amplification factor, 62-2
 - buckling, 61-2
 - center, 45-17
 - compressive force relationship, 62-2
 - design strength, 59-5
 - /force interaction equation, 62-2
 - magnifier, 62-2
 - moment, 44-8 (ftn)
 - reinforcement, selection, 55-4
 - rigidity, 44-3
 - stiffness, 47-13, 53-4
 - strength, 77-6
 - stress, 44-11
- Flexure slab design, 51-3
- Flint, 35-32
- Flipped sine, 6-4
- Float, 86-11, G-6
 - independent, G-8
 - steam trap, 16-14
 - time, 86-11
 - total, G-14
 - wooden, 83-9, 83-10
- Floatable, 29-7
- Floating object, 15-16, 15-18
- Floc, 26-8, G-6
- Flocculation, 26-12, 34-23
 - additive, 26-9
 - chemical, 29-8
 - tapered, 26-12
- Flocculator, 26-10, 29-8
 - clarifier, 26-12, 26-12 (tbl)
- Flood, 20-6
 - control dam, 20-21
 - damaging, 20-6
 - design, 20-5, 20-6
 - design basis, 20-6
 - devastating, 20-6
 - hundred year, 20-6
 - nuisance, 20-6
 - one percent, 20-6, 20-7
 - probability, 20-6
 - probable maximum, 20-6
 - routing, 20-23
 - standard, 20-6
 - standard project, 20-6
- Flooding, 34-2, 34-22
 - velocity, 34-2
- Floor
 - area, 82-8
 - beam, 59-2
 - open grid, 57-4
 - system, slab-beam, 50-3 (fig)
- Flotation, G-6
 - thickening, dissolved air, 30-14
- Flow, 73-6
 - accelerated, 19-21, G-1
 - around a cylinder, 17-41, 17-43
 - base, 20-7 (ftn), G-2
 - choked, 19-21
 - coefficient of, 17-30
 - coefficient, valve, 17-13
 - control, 19-21
 - critical, 16-7, 19-17, G-5
 - culvert, 19-28
 - culvert, classification, 19-28 (fig)
 - curve, 35-22, 43-5
 - decelerated, 19-21
 - dry weather, 20-7 (ftn), G-5
 - energy, 13-3, 16-2 (ftn)
 - equalization, 29-3, 34-23
 - factor, 17-14
 - front velocity, 21-4
 - fully turbulent, 16-7, 17-5
 - gravity, 16-5, 18-5
 - in circular channels, A-75
 - laminar, 16-7
 - line, 21-7, 29-2
 - maximum, 73-6
 - measurement, 17-26, 26-3
 - net, 20-7, 21-7, 21-8
 - net, seepage, 21-7
 - nonuniform, 19-2, 19-15, 19-21
 - nozzle, 17-32
 - number, 26-12
 - of water, steel pipe, A-55
 - open channel, 16-5
 - over flat plate, 17-44
 - overland, 20-7 (ftn), G-10
 - pacing chlorinator, 29-13
 - rapid, 19-16, G-12
 - rate, 26-13, 73-6, 73-8
 - rate equation, 26-12
 - rate of, 73-5, 73-6
 - rate, 15 min passenger car
 - equivalent, 73-10
 - rate, maximum service, 73-5
 - rate, peak pedestrian, 73-21
 - rate, pedestrian unit, 73-21
 - rate, saturation, 73-15
 - rate, service, 73-5, 73-10
 - rate, volumetric, 17-3

- ratio, 73-15
- regime, G-6
- regime, subsonic, 14-15 (ftn)
- resistance, 34-5
- retarded, G-12
- rough-pipe, 17-5
- shear, 45-16
- sheet, 20-3
- shooting, G-13
- steady, 19-2, G-13
- steady, well, 21-5
- streamline, 16-7
- subcritical, 19-16, G-13
- subsurface, 20-7
- supercritical, 19-16, G-14
- surface, 20-7 (ftn)
- through, profit, 88-2
- through velocity, 26-5
- tranquil, 19-16, G-14
- tubular, 30-6
- turbulent, 16-7, 17-5
- type, 19-2
- type-*n*, culvert, 19-29
- uniform, 16-9, 19-2, 19-4, 19-6, G-14
- uninterrupted, 73-3
- unit width, 73-21
- unsteady, well, 21-6
- value, asphalt mix, 76-11
- varied, 19-21, G-15
- versus density, 73-7 (fig)
- viscous, 16-7
- work, 13-3
- Flowable concrete, 48-7
- Flowchart
 - analysis, 59-6 (fig)
 - design, 59-9 (fig)
- Flowing
 - well, G-6
- Flowmeter
 - electromagnetic, 17-27
 - magnetic, 17-27
 - ultrasonic, 17-28
- Flue gas
 - 24-12, 32-4 (ftn)
 - calculation, 24-13
 - cleanup, 32-2
 - desulfurization, 24-5, 34-2
 - dew-point, 24-14
 - recirculation, 34-10
 - temperature, 24-14
- Fluid
 - Bingham, 14-7
 - density, 14-3
 - dilatant, 14-7
 - friction, 72-5
 - height equivalent, 15-5 (tbl)
 - ideal, 14-2
 - Newtonian, 14-2, 14-7
 - non-Newtonian, 14-2
 - pressure, 14-2, 15-15
 - pseudoplastic, 14-7
 - real, 14-2
 - rheopectic, 14-7
 - shear stress, 14-6
 - specific weight, equivalent, 37-9
 - stream coordinates, 17-18 (fig)
 - thixotropic, 14-7
 - type, 14-2
 - velocity, maximum, 17-3
 - viscosity type, 14-6
- Fluidity, 14-6
- Fluidized-bed
 - boiler, 34-11
 - combustion, 24-5
 - combustor, 34-10 (fig)
- Fluke, 27-8
- Flume, G-6
 - Parshall, 19-14
 - Parshall, *K*-values, 19-14 (tbl)
- Fluoridation, 26-14
 - chemicals, 25-6
- Fluoride ion, in water, 25-6
- Fluorosis, 25-6
- Flush
 - air, G-1
 - first, 32-14
- Flushing, 76-14 (ftn)
 - pavement, 76-5
- Flux, 66-1
 - cored arc welding, 66-2
 - Darcy, 21-4
 - momentum, 17-14 (ftn)
- Fly
 - ash, 24-3, 48-2
 - ash, class C, 77-12
 - ash, class F, 77-12
 - ash, pavement, 77-12
 - filter, 29-8
- Flying form, 49-7
- Focus, 7-10
- Food-to-microorganism ratio, 30-5
- Foot
 - board, 1-8
 - crow's, 81-3
 - standard cubic, 24-2
- Footing, 36-2
 - cantilever, 36-2
 - column, 36-2, 55-3
 - combined, 36-2
 - concrete, 55-1
 - eccentric load, 36-9
 - isolated, 36-2
 - loading, 55-2 (fig)
 - overturning moment, 36-9 (fig)
 - spread, 36-2
 - strip, 36-2
 - wall, 36-2, 55-2
- Force (*see also type*), 41-2, 72-2
 - accelerating, railroad, 75-4
 - adfreeze, 38-6
 - amplification, 41-11
 - axial member, 41-12
 - buoyant, 15-16
 - center of, 72-19, 72-20
 - centrifugal, 72-4
 - centripetal, 72-4, 72-5 (fig)
 - component and direction angle, 41-2 (fig)
 - concentrated, 41-2
 - constant, 72-2
 - conversions, SI, A-3
 - couple system, 41-4
 - downdrag, 38-6
 - draft air injection, 26-4
 - equivalent resultant, 41-4
 - external, 41-2, 72-2
 - field, central, 72-19
 - g*-, 72-4
 - impulsive, 72-15
 - inertial, 70-2, 72-5
 - inertial resisting, 75-2
 - internal, 41-2, 41-13, 72-2
 - linear-velocity-dependent, 72-18
 - main, 28-4, G-6
 - majeure, 88-4
 - member, 41-16
 - normal, 15-12, 72-4 (ftn), 72-6, 75-5
 - normal, on a dam, 15-11
 - on a dam, 15-11
 - on blade, jet, 17-35
 - on pipe bend, 17-36
 - on plate, jet, 17-34
 - point, 41-2
 - pound, A-3
 - quadratic velocity-dependent, 72-19
 - reversed effective, 72-5 (ftn)
 - specific, 19-15
 - system equilibrium condition, 41-6 (tbl)
 - system, type, 41-6
 - tendon jacking, 50-4
 - tensile, 41-16
 - tension, 41-16
 - tractive, 75-3
 - tractive, locomotive, 75-4
 - unbalanced, 41-1, 72-4
- uplift, 21-9
- velocity-dependent, 72-18
- web, 59-17
- work performed by, 9-4
- Forcing
 - function, 10-1, 10-3
- Forebay, 18-24, G-6
- Forecast, 87-42
 - exponentially weighted, 87-42
- Forecasting, 87-42
 - moving average, 87-42
- Foresight, 78-10
- Form
 - center-radius, 7-10
 - cis, 3-8
 - concrete, 49-6
 - drag, 17-41
 - exponential, 3-7, 3-8
 - flying, 49-7
 - functional, 3-2
 - general, 7-5
 - intercept, 7-5
 - log-linear, 3-11
 - Newton, 12-3 (ftn)
 - normal, 7-5
 - operational, log, 3-5
 - phasor, 3-8, 84-5
 - phasor, vector, 5-2
 - point-slope, 7-5
 - polar, 3-8, 7-5
 - polar, vector, 5-2
 - rectangular, 3-7
 - rectangular, vector, 5-2
 - row canonical, 4-2
 - row-reduced echelon, 4-1
 - slope-intercept, 7-5
 - standard, 7-9
 - standard polynomial, 3-3
 - tie, 49-6
 - trigonometric, 3-7
 - two-point, 7-5
- Formality, 22-11
- Formation
 - artesian, G-2
 - constant, 22-15
 - enthalpy, 22-17, 22-18
 - heat of, 22-17
- Forming, slip, 49-7
- Forms, concrete pressure on, 49-8
- Formula
 - Babcock, 17-10
 - Camp, 29-6
 - Cardano's, 3-4
 - chemical, 22-4, A-88
 - Churchill, 28-7, 28-8
 - Colding, 31-7
 - Donnan, 31-7
 - double-angle, 6-3
 - Dulong's, 24-14
 - empirical, 22-6
 - FAA, 20-4
 - G.K., 19-4 (ftn)
 - half-angle, 6-4
 - Hazen's, 21-2, 35-23
 - J. B. Johnson, 45-4
 - kinematic wave, 20-4
 - Korteweg, 17-39
 - Lagrange's, 5-5
 - Maney, 45-13
 - Manning, 19-4
 - Marston's, 40-8
 - miscellaneous, angle, 6-4
 - NRC, 29-10
 - O'Connor and Dobbins, 28-7
 - Panhandle, 17-10
 - parabolic column, 45-4
 - prismoidal, 80-5
 - rational, 20-14
 - secant, 45-4
 - soil parameter, 35-8
 - Spitzglass, 17-10
 - Steel, 20-5

- Taylor's, 8-8
- two-angle, 6-4
- uniform acceleration, 71-4 (tbl)
- Velz, 29-11
- weight, 22-5
- Weymouth, 17-10
- Formwork, 49-6
 - concrete pressure on, 49-8
 - pressure on, 49-8
 - stay-in-place, 51-9
- Forward
 - pass, G-6
 - soil pressure, 37-2
 - stationing, 79-3
 - tangent, 79-2
- Foundation, 36-1
 - compensated, 36-10
 - shallow, 36-1
- Four-phase signal, 73-14
- Fourier
 - analysis, 9-7
 - inversion, 9-7
 - number, 1-9 (tbl)
 - series, 9-7
 - transform, fast, 9-8
 - waveform, 9-7
- Fourier's theorem, 9-7
- Fourth
 - moment of the mean, 11-14
 - standardized moment, 11-14
- Fraction
 - finer, 35-3
 - gravimetric, 22-6, 24-2
 - growth rate, 3-11
 - inhalable, 32-7
 - ionized, HOCl, 26-20
 - mole, 14-6, 24-2
 - of ionization, 22-15
 - partial, 3-6, 9-3
 - partial pressure, 24-2
 - remaining curve, 26-6
 - removal, 30-6
 - removed, total, 26-6
 - respirable, 32-7
 - submerged, 15-16
 - thoracic, 32-7
 - volumetric, 24-2
- Fracture
 - appearance transition temperature, 43-15
 - critical, 74-1
 - failure, 74-1
 - strength, 43-3
 - transition plastic temperature, 43-15
- Frame, 41-12
 - deflection, 47-5
 - inertial, 71-10
 - wide beam, 51-6 (fig)
- Framing connection, 65-7
- Francis
 - turbine, 18-23
 - weir equation, 19-11
- Frangible coupling base, 75-13
- Fraud, 88-6
 - compensatory, 88-6
 - statute of, 88-3 (ftn)
- Fraudulent act, 88-6
- Free
 - aquifer, 21-1, 21-2
 - body, 41-8 (fig)
 - body, coordinate, diagram, 41-21
 - body diagram, 41-8
 - chlorine residual, 25-9
 - flow mode, 19-14
 - flow speed, 73-3, 73-6, 73-8, 73-10
 - flow speed, base, 73-13
 - moment, 41-4, 41-9 (fig)
 - path, gas, 34-9
 - pulley, 41-11
 - residual, G-6
 - surface, 16-5
- Freeboard distance, G-7
- Freedom, degree of, 11-7, 47-10, 71-1, 71-12
 - chi-squared, 11-7, 11-8
- Freehaul, G-7
 - distance, 80-8
- Freeman's formula, 26-24 (ftn)
- Freeway, 73-3, 73-7, 73-8, G-7
 - weaving segment, 73-26 (fig)
- Freeze
 - in piles, G-7
 - thaw cycle, 76-16
 - /thaw, exposure category F, concrete, 48-10
- Freezing, 76-30
 - pavement, 76-30
- Freight, ton, 1-7
- Freon, 32-5
- Frequency
 - analysis, 9-8 (ftn)
 - carrier, 85-4
 - crash, 75-16 (ftn)
 - distribution, 11-10
 - electrical, 84-4
 - multiplier, 83-7, 83-8
 - natural, 9-7
 - of occurrence, 20-5
 - polygon, 11-10
 - storm, 20-5
- Fresnel integral function, 9-8 (ftn)
- Fretting corrosion, 22-20
- Friable, G-7
- Friction (*see also type*), 17-4
 - angle, effective stress, 35-26
 - angle, external, 37-3, 37-4 (tbl), 37-5
 - angle, interfacial, 31-5 (tbl)
 - angle, soil, 37-4 (tbl)
 - angle, wall, 37-5
 - belt, 72-7
 - brake, 85-13
 - coefficient of, 15-12, 65-3, 72-6, 72-7, 75-5
 - Coulomb, 72-5
 - course, open-graded, 76-3
 - dynamic, 72-5
 - factor, 77-7
 - factor chart, Moody, 17-6, 17-7 (fig)
 - factor, Darcy, 17-5 (ftn), A-51, A-52, A-53, A-54
 - factor, Fanning, 17-5 (ftn)
 - factor, pavement, 77-10 (fig)
 - flat, 72-5
 - flat belt, 72-7 (fig)
 - fluid, 72-5
 - head, 18-6
 - head loss, 17-4 (ftn)
 - heating, 17-4 (ftn)
 - horsepower, 18-9
 - internal, angle of, 35-17, 35-26, 40-7, 43-8
 - loss, gas, 17-9
 - loss, skin(ftn), 17-4 (ftn)
 - loss, slurry, 17-11
 - loss, steam, 17-9
 - pile, 38-1
 - pipe, 17-14
 - power, 18-9
 - pressure drop, 17-4 (ftn)
 - ratio, 35-18
 - sideways, 72-8, 79-7
 - skin, 17-41
 - skin, coefficient, 38-3
 - skin, negative, 38-6
 - static, 72-5
 - turbulent flow, 17-5, 17-6
 - typical coefficients of, 72-6 (tbl)
 - unit shaft, 38-3
 - wall, soil, 37-3
- Frictionless surface, 41-7
- Frontage road, G-7
- Frontal
 - area, 17-41
 - auxiliary view, 2-2
- Frost
 - damage, 76-30
 - effect, 76-16
- heave, 37-12, 38-6
- jacking, 38-6
- pavement, 76-30
- susceptibility, G-7
- Froude number, 1-9 (tbl), 17-47, 19-18
- Fuel
 - bound NOx, 32-9
 - consumption, vehicular, 75-3, 75-4
 - diesel, 24-7
 - economy, 75-3, 75-4
 - loss, unburned, 24-16
 - NOx, 32-9
 - oil, 24-6
 - oxygenated, 32-5
 - property, 24-6 (tbl)
 - refuse-derived, 24-4, 31-10, 31-11 (tbl)
 - standard condition, gaseous, 24-2
 - switching, 32-15
 - tire-derived, 24-4
 - viscosity, A-24
 - waste, 24-4
- Fugitive
 - dust, 32-7
 - emission, 32-8, 34-16
- Full
 - bridge, 85-11
 - cloverleaf, 73-25
 - composite action, 64-3
 - depth asphalt concrete, 76-26 (fig)
 - depth asphalt pavement, 76-2, 76-25, 76-28
 - depth reclamation, 76-28
 - lift safety valve, 16-12
 - load value, motor, 84-13
 - mortar bedding, 68-4
 - penetration groove weld, 66-2
 - station, 78-9
 - wave symmetry, 9-7 (tbl)
- Fully
 - amortized bond, 87-29 (ftn)
 - compensated foundation, 36-10
 - prestressed member, 56-3
 - restrained connection, 65-7
 - turbulent flow, 16-7, 17-5
- Fulvic acid, G-7
- Function
 - analytic, 8-1
 - asymmetrical, 7-4
 - binomial probability density, 11-4
 - circular transcendental, 6-2
 - continuous distribution, 11-6
 - covers, 6-4
 - density, 11-4
 - error, 9-9, 11-8, A-15
 - exsec, 6-4
 - first moment of, 9-6
 - forcing, 10-1
 - havers, 6-4
 - hazard, 11-9
 - holomorphic, 8-1
 - hyperbolic, 6-4
 - in a unit circle, trigonometric, 6-3 (fig)
 - integral, 9-8
 - integral cosine, 9-8, 9-9
 - integral elliptic, 9-8 (ftn)
 - integral exponential, 9-9
 - integral Fresnel, 9-8 (ftn)
 - integral gamma, 9-8 (ftn)
 - integral of combination, 9-2
 - integral sine, 9-8
 - Lagrange stream, 17-4
 - mapping, 7-3
 - moment, 44-14
 - of an angle, 6-2
 - of related angle, 6-3
 - performance, 11-9
 - regular, 8-1
 - safety performance, 75-16
 - second moment of, 9-6
 - stream, 17-4
 - stream potential, 17-3
 - symmetrical, 7-4

- transcendental, 8-2
 trigonometric, 6-2
 unit impulse, 10-6
 unit step, 10-6
 values for positive x values,
 complementary, A-15
 values for positive x values, error, A-15
 vector, 5-5
 velocity potential, 17-3
 vers, 6-4
 well, 21-7
- Functional
 form, 3-2
 group, organic, 23-1, 23-3
 Functionally obsolete, bridge, 74-2
 Fund, sinking, 87-7
 Fundamenta theorem of calculus, 9-4
 Fundamentals of Engineering exam, 90-1
 Fungicide, 32-12
 Fungus, 27-6, G-7
 Furnace
 efficiency, 24-16
 sorbent-injection, 24-5
 Future worth, 87-5
- G**
- g -force, 72-4 (ftn)
 G.K. formula, 19-4 (ftn)
 G-P system, 28-4
 Gabion wall, 37-2
 GAC, 26-14, 29-13
 Gage (*see also* Gauge), 14-2 (ftn)
 factor, 85-8, 85-9
 pressure, 14-2, 15-2, 15-6 (ftn)
 spacing, 60-2
 Gaging, stream, G-13
 Galton's distribution, 11-8
 Galvanic
 action, 22-18
 corrosion, 22-18
 series, 22-19 (tbl)
 Galvanized steel pipe, 16-10
 Gamma integral function, 9-8 (ftn)
 Gantt chart, 86-9, 86-10
 Gap, 73-6, G-7
 critical, 73-6
 -graded, G-7
 -graded mixture, 76-3
 -graded soil, 35-2
 traffic, 73-6
 Garbage, 24-4, 31-1
 Gas, 34-9
 absorption, 34-2
 absorption coefficient, 31-9 (tbl)
 acid, 32-4
 blast-furnace, 24-8 (ftn)
 coke-oven, 24-8 (ftn)
 collection, 31-6
 constant, universal, 14-10
 degradability, 34-7 (tbl)
 desorption, 34-2 (ftn)
 digester (*see also* Methane), 30-16
 dissolved in liquid, 22-9
 extraction well, 31-6
 flue, 24-12
 friction loss, 17-9
 greenhouse, 32-8
 incompressible, 16-2 (ftn)
 landfill, 31-5
 liquefied petroleum, 24-8
 manufactured, 24-8 (ftn)
 metal arc welding, 66-2
 methane, 30-16
 natural, 24-8, 24-11
 noble, 22-3
 off-, 34-21
 producer, 24-8 (ftn)
 properties, A-95
 specific heat, 24-2
 stack, 24-12
 sulfur in stack, 32-4
 synthetic, 24-5, 24-8
 town, 24-8 (ftn)
 wah, G-15
 water, 24-8 (ftn)
 Gasification, 32-13
 Gasohol, 24-7
 Gasoline, 24-6
 characteristics, 32-8
 pollution, 32-8
 reformulated, 24-7
 Gate valve, 16-12
 Gauge (*see also* Gage), 14-2 (ftn)
 bonded strain, 85-8 (ftn)
 diaphragm, 15-2
 draft, 15-3 (ftn)
 dummy, 85-10
 nuclear, 35-21
 pitot, 17-28 (fig)
 pitot-static, 17-28 (fig)
 staff, 19-11
 strain, 15-2, 85-8, 85-13
 unbonded strain, 85-8 (ftn)
 wire, American, 84-8
 Gauging, stream, 19-2
 Gauss-Jordan elimination, 4-2
 Gauss' hypergeometric equation, 10-5
 Gaussian distribution, 11-6
 Gear
 motor, 18-11, 84-14 (ftn)
 overdrive, 75-3
 rotex, 83-9, 83-10
 Gelular resin, 26-17
 General
 aviation airport, 79-21
 contractor, 88-4
 damages, 88-7
 expense, 87-32
 form, 7-5
 ledger, 87-33
 ledger system, 87-33 (ftn)
 motion, 72-2
 Motors barrier, 75-13
 overhead, 86-6
 partner, 88-1
 plane motion, 72-2
 plant overhead, 87-33
 shear failure, 36-2
 term, 3-10
 triangle, 6-5 (fig)
 Generation trip, 73-5
 Generator, 84-11 (ftn), 84-15
 pollution, 32-2
 Generic collector collection efficiency, 34-19
 Geobar, G-7
 Geocell, G-7
 Geocomposite, G-7
 liner, 31-4
 Geodetic
 dilution of position, 78-6
 level, 78-10
 survey, 78-5
 Geofam, G-7
 Geographic Information System, 78-7
 Geogrid, 31-5, G-7
 Geoid, 78-6
 Geomat, G-7
 Geomembrane, 31-4, G-7
 Geometric
 delay, 73-14
 design, airport, 79-21
 design, railway, 79-21
 growth, 3-11
 mean, 11-12
 sequence, 3-11
 series, 3-12
 similarity, 17-45
 slope, 19-3
 stress concentration, 44-4
 Geonet, G-7
 Geopipe, G-7
 Geospacer, G-7
 Geostationary orbit, 72-20
 Geostrip, G-7
 Geosynthetic, 31-4, 40-10, G-7
 Geotechnical safety and risk
 mitigation, 35-33
 Geotextile, 40-10
 specifications, 40-11
 symbols, A-106, G-7, A-107
 Germain correlation, 29-11
 Giardia cyst, 26-20
 Girder, 59-2
 AASHTO-PCI standard,
 section, 56-8 (fig)
 depth, 63-1
 hybrid, 63-1
 plate, 59-2, 63-1 (fig)
 properties, AASHTO-PCI standard,
 section, 56-9 (fig)
 standard, AASHTO-PCI, 56-8
 web design, 63-2
 Girt, 59-2
 GIS, 78-7, G-7
 Glacial till, G-7
 Glass, volcanic, 35-32
 Glauconite, 22-22, 26-17
 Global
 distillation, 32-12
 positioning system, 78-6
 warming, 32-8
 Globe valve, 16-12
 Glycol, 23-2 (tbl)
 GM barrier, 75-13
 GMT, G-7
 Gneiss, 35-32
 Gobar gas, G-7
 Gold point, 85-6 (ftn)
 Golf ball, 17-42
 Golgi
 apparatus, 27-2
 complex, 27-2
 Gon, 78-7
 Gore, G-7
 area, 73-26
 GPS, 78-6
 stand-alone navigational mode, 78-6
 surveying, kinematic, 78-6
 surveying, pseudokinematic, 78-6
 Grab
 sample, 28-15
 sampling, 22-24
 Grad, angular measurement, 78-7
 Gradation, 35-2
 Grade, 78-7
 asphalt, 76-2
 bolt, 45-9
 change, rate of, 79-12
 line, 80-3
 line, energy, 16-8, 17-15
 line, energy, without friction, 16-9 (fig)
 line, hydraulic, 16-8, 17-16
 line, hydraulic, without
 friction, 16-9 (fig)
 point, 80-3, 81-3, 81-5 (fig)
 resistance, 75-2
 roadway, 75-2
 rod, 81-4, 81-5 (fig)
 rod reading, 81-4
 stake, 81-1
 steel, 48-10
 structural rivet, 45-9 (ftn)
 viscosity, 14-9
 weathering, 67-5
 Graded performance, asphalt, 76-15
 Gradian, 78-7
 Gradient, G-7
 cash flow, 87-8, 87-9 (fig)
 energy, 19-3, G-6
 factor, exponential, 87-26
 hydraulic, 21-2
 roadway, 75-2
 ruling, 75-4

series cash flow, 87-4
 vector, 8-5
 velocity, 14-6, 17-14, 26-11

Grading
 gap, 5-5
 penetration, 76-2
 soil, 35-2
 viscosity, 76-2

Graetz number, 1-9 (tbl)

Grain, A-3, A-4
 alcohol, 24-7
 per gallon, 25-3
 size, effective, 35-2, 35-23
 unit, 25-3, 26-17 (ftn)

Grains per gallon, 22-24 (ftn)

Gram
 -mole, 22-5
 -negative cell, 27-2

Granite, 35-32

Granular
 activated carbon, 26-14, 29-13, 34-3
 soil, 37-2

Graph
 curve, 7-3
 directed, 86-10
 influence, 41-10
 linear equation, 3-7
 polynomial, 3-4

Grashof number, 1-9 (tbl)

Grate-type street inlet, 28-5

Gravel, G-7
 cohesion, 35-27
 pack, well, 21-4
 screen, 21-5

Gravimetric
 analysis, 22-6, 24-2
 fraction, 22-6, 24-2

Gravitation, Newton's law of, 72-20
 universal, 72-20

Gravitational
 constant, 1-2, 72-20
 energy, 13-3, 16-1, 16-2 (ftn)
 water, G-7

Gravity
 altitude, 1-2
 belt thickening, 30-15
 center of, 70-1
 dam, 15-12 (ftn)
 distribution, 26-24
 earth, 1-2
 flow, 16-5, 18-5
 sewer, 28-4
 specific, 14-4, 35-8
 standard, 1-2
 thickening, 30-14
 wall, 37-1
 well, 21-2, 21-4

Grease, 28-14, 29-7

Greek alphabet, 3-1

Green
 bar, 48-10
 period, 73-21
 ratio, effective, 73-15
 sand, 26-17
 time, effective, 73-20

Green's
 law, 2-4
 theorem, 2-4

Greenhouse
 effect, 32-8
 gas, 32-8

Greenman versus Yuba Power, 88-7 (ftn)

Greensand, 22-22

Greenshields
 method, signal timing, 73-17
 -Poisson method, 73-17

Grid, 34-8, 85-8
 floor, open, 57-4
 meridian, 78-12
 roller, 35-18

Grillage, G-7

Grinding, scum, 29-7

Grip, 45-12

Grit, 29-6, 34-23
 chamber, 29-6, 29-7
 clarifier, 29-6

Groove
 weld, 66-2, 66-8
 weld symbol, bridge
 construction, 66-9 (fig)
 weld, complete-penetration, 66-2, 66-8
 weld, partial-penetration, 66-2, 66-9

Grooving, pavement, 77-12

Gross
 air-to-cloth ratio, 34-5
 area, 60-2
 bearing capacity, 36-3
 filtering area, 34-5
 filtering velocity, 34-5
 heating value, 24-14
 margin, 87-36
 moment of inertia, 50-16
 profit, 87-37
 rain, 20-17
 rainfall, 20-17

Ground
 rod, 81-4, 81-5 (fig)
 stake, 81-1
 stake, measurement, 81-1

Groundwater, 20-7 (ftn), G-7
 dewatering, 31-7
 table, 37-9, 40-5

Group
 business, 83-2
 chemical, 22-2
 dimensionless, 1-8, 1-9 (tbl)
 hydroxyl, 23-1
 index, 35-4
 occupancy, 82-6, 82-7 (tbl)
 pace, 73-4
 pile, 38-5
 process, 86-1

Grout, 67-6
 -bonded concrete, 77-13
 compressive strength, 67-6
 modulus of elasticity, 67-6
 slump, 67-6

Grouted pile, 38-6

Grouting, partial, 68-6

Growth
 bacterial, 27-6 (tbl)
 exponential, 3-11, 10-9
 factor, 76-17
 geometric, 3-11
 instantaneous, 3-11
 logistic, rate constant, 27-4
 Malthusian, 3-11
 organismal, 27-3
 population, 3-11

Growth rate, 3-11
 arithmetic, 3-11
 average annual, 3-11
 coefficient, maximum specific, 28-6
 constant, 3-11
 exponential, 87-4
 fraction, 3-11
 linear, 3-11
 maximum specific, 30-7
 net, 28-7
 specific, 28-6

g's, units of, 72-4 (ftn)

Guard stake, 81-1
 measurement, 81-1

Guardrail, 75-13
 highway, 75-13
 tension cable, 75-13
 W-beam, 75-13

Guidance
 positive, 75-9, 75-10
 sub-task, 75-8

Guinea, 81-1

Gumbo, G-7

Gunter's chain, 78-7

Gutter inlet, 28-5

Gyratation
 least radius of, 42-6
 radius of, 42-6, 45-2, 61-4, 70-2

Gyratory compactor, Superpave, 76-15

H

H-pile, 38-4

HAA5, 25-10

Hagen-Poiseuille equation, 17-7

Half
 -angle formula, 6-4
 -angle thread, 45-14
 -bridge, 85-11
 -lath stake, 81-1
 -life, 3-11, 22-14
 -life, decay, 10-10
 -velocity coefficient, 28-6
 -wave symmetry, 7-4, 9-7 (tbl)
 -year rule, 87-3

Halide, (tbl), 23-1 (tbl)
 alkyl, 23-2 (tbl)

Halite, 35-32

Haloacetic acid, 25-10

Halogen, 22-3, 23-1 (tbl)

Halogenated compound, 25-9

Halomethane, 32-6

Halon, 32-6

Hammer
 double-acting, 38-2
 drop, 38-2
 single-acting, 38-2
 water, 17-38 (fig)

Hard
 hat, 83-7
 material, 43-1
 water, 26-15, G-7

Hardening strain, 43-5

Hardness, 25-5 (fig)
 calcium, 25-3
 carbonate, 22-21 (ftn), 25-3, G-4
 cutting, 43-13, 43-14
 file, 43-13
 ions, water, 25-4
 magnesium, 25-3
 noncarbonate, 22-21, 25-3, 25-4
 number, Brinell, 43-13
 penetration test, 43-14 (tbl)
 permanent, 22-21, 25-4, G-11
 scale, Mohs, 43-13 (fig)
 scale, steel, 43-15 (tbl)
 temporary, 22-21, G-14
 test, 43-13
 test, Brinell, 43-13
 test, Rockwell, 43-13
 total, 22-21
 water, 22-21, 25-3, 25-4

Hardpan, G-8

Hardy Cross method, 17-24, 44-19

Harmon's peaking factor, 28-2

Harmonic
 mean, 11-12
 sequence, 3-11
 series, 3-12
 terms, 9-7

Hat, hard, 83-7

Haul, distance, 80-7 (fig), 80-8

Haulage
 line, zero, 80-6
 rope, 45-21

Havers function, 6-4

Haversine, 6-4

Hay bale, 80-11

Hazard (*see also type*)
 acute, 83-5, 83-6
 bicarbonate, 25-11
 boron, 25-11
 chemical, 83-4
 chronic, 83-5, 83-6
 function, 11-9

- power line, 83-7
- salinity, 25-11
- sodium, 25-11
- Hazardous
 - air pollutant, 32-2
 - material, 33-1
 - spill, 32-15
 - waste, 32-2
 - waste incinerator, 34-15 (fig)
 - waste, disposition, 33-2
 - waste, incineration, 34-14
- Hazen-Williams
 - constant, A-50
 - empirical formula, 21-2
 - equation, 17-8
 - formula, 35-23
 - nomograph, A-57
 - roughness pipe, A-50
 - uniformity coefficient, 35-2
 - velocity, 19-6
- Hazmat, 33-1
- HCM exhibit, two-line highway
 - adjustment, 73-13 (tbl)
- HDPE pipe, 16-9
- Head, 15-5 (ftn), 18-6, G-8
 - acceleration, 18-2, 18-3 (ftn)
 - added, 17-15
 - added, pump, 17-15
 - dynamic, 18-6
 - effective, 17-17, 18-6
 - extracted, 17-15
 - friction, 18-6
 - hydraulic, 26-13
 - impact, 16-4
 - loss, 17-4
 - loss, effect of viscosity, 17-11
 - loss, friction, 17-4
 - loss, slurry, 17-11
 - protection, 83-7
 - static discharge, 18-6
 - static suction, 18-6
 - total, 16-2
 - velocity, 18-6
- Headed
 - deformed bar, 55-6
 - stud, 64-3
- Header information, 81-1
 - speed, 73-3
- Headlight sight distance, 79-16
- Headwall, G-8
- Headway, 73-6, G-8
- Health, company, 87-35
- Heaping capacity, 80-9
- Hearing protection, 83-8
 - device, 83-8
- Heat
 - capacity, 13-4
 - conversion, SI, A-3
 - loss, 30-17
 - of combustion, 24-14, A-94
 - of formation, 22-17
 - of hydration, G-8
 - of reaction, 22-18
 - release rate, 31-10
 - specific, 13-4
 - transfer, 30-17
 - transfer coefficient, 30-17
 - transfer, fluid viscosity, A-24
- Heating
 - friction, 17-4 (ftn)
 - losses, 84-17
 - value, 24-14
 - value, methane, 30-17
- Heave, 21-9
 - clay, 39-3
 - frost, 37-12, 38-6
- Heavy
 - hydrogen, 22-2
 - metal, 22-3
 - metal, in wastewater, 28-14
 - vehicle factor, 73-8
 - vehicle median barrier, 75-13 (fig)
- Heel, 15-18 (ftn), 37-12
 - dam, 15-11, 15-12
 - retaining wall, 54-3
- Height, 2-2
 - building, allowable, 82-8
 - cell, 31-3
 - critical, excavation, 39-3
 - measurement, parallax, 78-20
 - object, 78-19
 - packing, 34-22
 - instrument, 78-10, 81-4
 - transfer unit, 34-22
 - piezometric, 21-2
 - rebound, 72-17
 - roughness, 2-4
 - waviness, 2-4
- Helix, 7-12
 - pitch, 7-12
 - thread angle, 45-14
- Helmet, 83-7
- Helminth, 27-4
- Henderson-Hasselbach equation, 27-3
- Henry's law, 22-9, 34-21
 - constant, 22-9 (tbl), 34-21 (tbl)
- Hepatitis, 27-6
- Herbicide, 32-12
- Hess' law, 22-18
- Heterotroph, 27-4
- Hexachlorobenzene, 32-12
- Hideout, 22-24
- High
 - density screed, 76-7
 - early strength portland cement, 48-1
 - head turbine, 18-21
 - lift safety valve, 16-12
 - occupancy vehicle, 73-7
 - performance concrete, 48-6
 - performance steel, 58-6
 - performance steel plate, mechanical property, 58-6 (tbl)
 - purity oxygen aeration, 30-4
 - range water reducer, 48-3
 - rate aeration, 30-4
 - rate filter, 29-8
 - slump concrete, 48-3
 - speed exit, 73-31
 - speed taxiway, 73-31
 - strength bolt, 58-4, 65-1
 - strength concrete, 48-6
 - strength low-alloy steel, 58-1
 - strength steel, 58-7
 - temperature, structural steel, properties, A-151
- Higher heating value, 24-14
- Highly significant results, 11-14
- Highway (*see also type*), 73-3, 75-15
 - arterial, G-2
 - barrier, 75-13
 - belt, G-2
 - Capacity Manual, 73-2
 - Class I, 73-12
 - Class II, 73-12
 - Class III two-lane, 73-12
 - curve, 79-3
 - divided, 73-3, G-5
 - guardrail, 75-13
 - interchange, 73-23
 - multilane, 73-10
 - rainwater runoff, 32-14
 - safety, 75-2
 - segment (*see also Segment*), 75-10
 - specific downgrade, 73-12
 - specific upgrade, 73-12
 - speed, average, 73-3
 - two-lane, 73-12
 - undivided, 73-3
- Highway Safety Manual*, 75-2
- Hindered settling zone, 30-14
- Hinge, 41-10
 - joint, 77-12
 - plastic, 44-19, 47-2, 47-17
- Hinged base, pole, 75-13
- Histogram, 11-10, 85-3
- History accident and crash, warrant,
 - signalization, 73-18
- HIV, 27-10
- HL-93
 - design load, 74-4
 - standard truck, 74-4
 - truck, 76-18
- Hobby, 87-12 (ftn)
- HOCl fraction, ionized, 26-20
- Hoist, 41-11
- Hoisting
 - cable, 45-21
 - rope, extra-flexible, 45-21
- Hole
 - cased, G-4
 - drilled, 60-2
 - in beam, 59-17
 - lamp, G-9
 - oversized, 65-1
 - punched, 60-2
 - slotted, 65-1
 - spacing, 65-1
 - standard, 60-2
 - tap, 15-3
- Hollow
 - brick, 67-2
 - structural section, 58-3
- Holographic
 - NDT method, 43-13
 - testing, 43-13
- Holomorphic function, 8-1
- Holonomic coordinate, 71-2
- Homogeneous
 - circuits, law of, 85-7
 - differential equation, 10-1, 10-2
 - linear equation, 3-7
 - second-order, 10-3
 - unit system, 1-2 (ftn)
- Homologous
 - family, pump, 18-13 (ftn)
 - pump, 18-13
- Honeycomb concrete, 49-5
- Hook, 50-23
 - standard, 55-6 (fig)
 - standard, masonry, 67-7
- Hooke's law, 43-2, 44-2 (fig), 45-20, 85-11
- Hoop
 - beam, 50-20
 - stress, 45-4, 45-6
- Horizon, 87-3, G-8
 - analysis, 87-17
- Horizontal
 - auxiliary view, 2-2
 - circular curve, 79-1
 - curve elements, 79-2 (fig)
 - curve, through point, 79-6 (fig)
 - dilution of position, 78-6
 - flow, grit chamber, 29-6
 - joint reinforcement, 67-7
 - multiplier, 83-7, 83-8
 - shear, 44-10
 - sightline offset, 79-11
 - stadia measurement, 78-8 (fig)
- Horsepower, 13-6, A-1, A-2
 - aero, 17-42
 - boiler, 24-16, 24-17
 - friction, 18-9
 - hydraulic, 17-15, 18-8 (tbl)
 - shaft, 45-14
 - theoretical, 17-15
 - water, 17-15, 18-8
- Horton
 - coefficient, 19-13
 - Einstein equation, 19-10
 - equation, 19-13, 21-9
- Hot
 - in-place recycling, 76-28
 - mix asphalt, 76-2, 76-10
 - mix asphalt concrete, 76-10
 - mix asphaltic concrete, 76-2
 - mix recycling, 76-28

plant mix, 76-10
 rubber asphalt mix, 76-29
 -weather concrete, 49-6
 -wire anemometer, 17-27
 Hourglass failure, 43-8 (ftn)
 Hourly
 vehicular volume warrant,
 signalization, 73-18
 volume, 73-9
 HOV, 73-7, G-8
 HPC, 48-6
 HS20-44 truck, 76-18
 HSM crash estimation method, 75-16
 Hub, 45-7
 stake, 81-1
 Hull convex, 7-2, 7-3
 Human
 error, 85-2
 factor, 75-8
 immunodeficiency virus (HIV), 27-10
 Humectant, 32-7 (ftn)
 binder, 32-7
 Humic acid, G-8
 Humus, G-8
 Hundred year
 flood, 20-6
 storm, 20-6
 Hveem
 cohesiometer, 76-14
 mix design method, 76-14
 resistance value test, 35-31
 stabilometer, 76-14
 Hybrid girder, 63-1
 Hydrant fire, 26-24
 Hydrated
 lime, 26-15
 molecule, 22-5
 Hydration, 22-11, 48-1, 48-3, G-8
 heat of, G-8
 water of, 22-5
 Hydraulic
 conductivity, 21-2
 depth, 16-6 (ftn), 19-3, G-8
 detention time, 30-5, 30-8
 diameter, 16-6 (ftn), 17-9, 19-3
 diameter, conduit shape, 16-6 (tbl)
 drop, 16-9 (ftn), 19-20 (ftn), 19-26
 element, circular pipes, A-30
 elements, A-75
 grade line, 16-8, 17-16, A-30
 gradient, 21-2
 head, 26-13
 horsepower, 17-15, 18-8
 horsepower equation, 18-8 (tbl)
 jack, 15-15
 jump, 16-9 (ftn), 19-23, G-8
 kilowatt equation, 18-8 (tbl)
 load, concrete, 49-8
 loading, 28-3, 29-10, 34-23
 mean depth, 19-2 (ftn)
 NPSHR, 18-21
 power, 18-7
 press, 15-15
 radius, 16-5, 19-2, A-30, G-8
 ram, 15-15
 retention time, 30-7
 truck crane, 83-9, 83-10
 Hydraulically
 long, 19-27
 short, 19-27
 Hydraulics, 17-2
 Hydrocarbon, (tbl), 23-1, 23-3 (tbl), 24-1
 aromatic, 24-1
 NPSHR correction factor, 18-21 (fig)
 pumping, 18-21
 saturated, 23-2 (tbl), 24-1
 unsaturated, 24-1
 viscosity, A-24
 Hydrochloric acid, 25-9, 32-4
 Hydrodynamics, 17-2

Hydroelectric
 generating plant, 18-23, 18-24
 plant, 18-24 (fig)
 Hydrogen
 available, 24-3
 damage, 22-20
 embrittlement, 22-20
 heavy, 22-2
 ion, G-8
 normal, 22-2
 sulfide, 28-5
 Hydrogenation, 32-13
 Hydrograph, 20-7
 analysis, 20-7
 separation, 20-7
 Snyder, 20-11
 synthesis, 20-11, 20-13
 triangular unit, 20-12
 unit, 20-8
 Hydrologic
 cycle, 20-1
 soil group, 20-16
 Hydrological cycle, G-8
 Hydrolysis, 23-2
 Hydrolyzing metal ion, 26-8
 Hydrometeor, G-8
 Hydrometer, 14-4
 test, 35-2
 Hydronium ion, G-8
 Hydrophilic, 14-12, G-8
 Hydrophobic, 14-12, G-8
 Hydrostatic, 15-4 (ftn)
 moment, 15-11
 paradox, 15-4
 pressure (*see also* Pressure), 15-4, 37-9
 pressure, vertical plane surface, 15-7 (fig)
 resultant, 15-6
 torque, 15-11
 Hydrostatics, 17-2
 Hydroxyl, 23-1 (tbl)
 group, 23-1
 Hyetograph storm, 20-2
 Hygroscopic, G-8
 water, G-8
 Hyperbola, 7-11
 equilateral, 7-12
 rectangular, 7-12
 unit, 6-5
 Hyperbolic
 cosecant, 6-5
 cosine, 6-4, 41-19
 cotangent, 6-5
 function, 6-4
 function, derivative, 8-2
 function, integral of, 9-2
 identity, 6-5
 radian, 6-5
 secant, 6-5
 sine, 6-4
 tangent, 6-4, 6-5
 Hypergeometric
 distribution, 11-5
 equation, Gauss', 10-5
 Hyperion Energy Recovery System, 30-20
 Hypersonic travel, 14-15
 Hypochlorous acid, 25-9
 Hypocycloid, 7-4
 Hypolimnion, 25-8, G-8
 Hypotenuse angle, 6-2
 Hypothesis, 22-5
 alternative, 11-15
 Avogadro's, 22-5
 null, 11-15, 75-12
 test, 11-15, 75-12
 Hysteresis, 85-5 (ftn)
 spring, 45-20

I

IACS copper, 84-2
 IBC, 82-1
 Ice point, 85-6 (ftn)

Ideal
 air, 24-9
 cable, 41-16
 capacity, 73-5
 column, 61-2
 combustion reaction, 24-9 (tbl)
 fluid, 14-2
 quantity, 24-9
 reaction, 22-8
 spring, 45-20
 yield, 22-9
 Idempotent set, law, 11-1
 Identity
 BAC-CAB, 5-5
 hyperbolic, 6-5
 logarithm, 3-5
 matrix, 4-1
 set, law, 11-1
 trigonometric, 6-2, 6-3, 6-4, 6-5
 IDF curve, 20-5
 Igneous rock, 35-32, G-8
 Ignitable substance, 32-2
 Ignition temperature, 24-8
 Illegitimate error, 85-2
 Illness
 building-related, 32-4
 occupational, 83-2
 Image
 photogrammetric, 78-18 (fig)
 raster, 78-7
 vector, 78-7
 Imaginary number, 3-1
 Imhoff cone, 25-9
 Immediate
 deflection, 50-15
 settling, 40-3
 Immiscible liquid, 15-12
 Impact, 72-17
 attenuator, 75-13
 central, 72-18
 central oblique, 72-18 (fig)
 direct, 72-18
 direct central, 72-17 (fig)
 eccentric, 72-18 (fig)
 elastic, 72-17
 endoergic, 72-17
 energy, 16-4, 43-14, 43-15
 energy test, 43-15
 exoergic, 72-17 (ftn)
 factor, 16-4, 40-9
 factor, bridge, 74-4
 factor, pipes, 40-9
 head, 16-4
 inelastic, 72-17
 load, 44-8
 loading, 44-7, 44-8
 modeling, vehicle, 75-13
 oblique, 72-18
 pedestrian, 75-15
 perfectly inelastic, 72-17
 perfectly plastic, 72-17
 plastic, 72-17
 protection, 83-7
 ramming, 40-11
 test, 43-15
 tube, 16-4
 Impactation parameter, 34-19
 Impactor, G-8
 cascade, G-4
 cyclone, G-5
 Impairment, substantial, 82-9
 Impedance, 84-5
 loss, 84-17
 Impeller
 axial-flow, 18-4 (fig)
 mixing, 26-11
 radial-flow, 18-4 (fig)
 specific speed, 18-12
 Impending motion, 72-5
 Impermeability, pavement, 76-5
 Impervious layer, G-8
 Implicit differentiation, 8-4

- Impounding reservoir, 20-19
 Impoundment depth, 20-19
 Impulse, 17-33, 72-14 (ftn)
 angular, 72-14
 applied, 72-15
 fluid, 17-33
 function, 10-6
 linear, 72-14
 -momentum principle, 17-33, 72-15
 -momentum principle, open system, 72-16
 turbine, 17-36, 18-21
 turbine installation, 18-22 (fig)
 Impulsive force, 72-15
 In
 -line filtration, 26-2
 -place density test, 35-21
 -vessel composting, 30-20
 In situ, 35-8, G-8
 form, concrete, 49-6
 In vitro, G-8
 In vivo, G-8
 In-place
 form, concrete, 49-6
 recycling, cold, 76-28
 Incidence
 rate, injury, 83-2
 Incident
 delay, 73-14
 recordable, 83-2
 Incidental resistance, 75-5
 Incineration, 24-4
 hazardous waste, 34-14
 infrared, 34-14
 liquid, 34-14
 MSW, 31-10
 oxygen-enriched, 34-14
 plasma, 34-14
 sludge, 30-20, 34-15
 soil, 34-15
 solid, 34-15
 Incinerator, 34-11, 34-13, 34-14
 hazardous waste, 34-15 (fig)
 no-boiler, 31-10
 performance, 34-13 (tbl)
 plasma, 34-14
 vapor, 34-15
 Inclined
 backfill, 37-6
 plane, 72-11
 stadia measurement, 78-8 (fig)
 Income, 87-34
 bracket, 87-25
 net, 87-34
 tax, 87-24
 Incomplete combustion, 24-12
 Incompressible gas, 16-2 (ftn)
 Inconsistent system, 3-7
 Increase, average, 11-16
 Incremental
 analysis, 87-17
 cost, 87-32
 Incursion, lane, 79-20
 Indefinite integral, 9-1 (ftn), 9-2, 9-4, A-10
 Indenter, Brale, 43-13
 Independent
 event, 11-3
 float, G-8
 variable, 3-2
 wire rope core, 45-21
 Indeterminacy
 degree of, 41-7, 41-8, 46-1
 kinematic, degree of, 47-10
 static, degree of, 47-7
 Indeterminate
 beam formulas,
 A-128, A-129, A-130, A-131, A-132
 statically, 41-7, 46-1
 statics, 46-1
 system, 41-8 (fig)
 truss, 46-7
 Index
 aggressive, 26-19
 compressibility, 35-25
 compression, 35-25, 40-4
 compression, secondary, 40-6
 contour, 78-22
 cost-effectiveness, 75-19
 density, 35-7
 group, 35-4
 Langelier, 26-18
 lifting, 83-7
 liquidity, 35-22
 Mohlman, G-10
 plasticity, 35-22
 Puckorius, 26-19
 recompression, 40-4
 reconsolidation, 35-25
 roughness height, 2-4
 Ryznar, 26-18
 shrinkage, 35-22
 sludge volume, 30-5
 spring, 45-20 (ftn)
 swelling, 35-25, 40-4
 terminal pavement serviceability, 76-20
 terminal serviceability, 76-17
 transverse reinforcement, 55-5
 viscosity, 14-9
 viscosity blending, 14-16
 water stability, 26-18
 Indicating, direct-tension washer, 45-13
 Indicator
 card, 85-14
 diagram, 85-14
 organism, 27-8
 solution, 25-2
 Indirect
 cost, 86-9
 leveling, 78-11, 78-12 (fig)
 manufacturing expense, 87-33
 material and labor cost, 87-33
 Induced
 drag, 17-41
 voltage, 17-27
 Inductance, 84-6
 Induction motor, 18-10, 84-14
 Inductive
 reactance, 84-6
 transducer, 85-4
 Inductor, 84-6
 Industrial
 exemption, 90-1
 wastewater, 28-2, 28-8, 29-1
 wastewater pollution, 34-23 (tbl)
 wastewater, standards, 29-1
 Industry classification system, 83-2 (ftn)
 Inelastic
 analysis, 47-2
 buckling, 61-4
 design, 59-8
 first-order analysis, 47-2
 impact, 72-17
 second-order analysis, 47-2
 strain, 43-3
 Inequality, 4-4
 Inertia, 70-2
 area moment, 42-3
 centroidal mass moment, 70-2
 centroidal moment of, 42-3, 42-4
 cracked, transformed, 50-15
 mass moment of, 70-2, A-165
 moment of, 42-3, A-114, A-165
 polar moment of, 42-6
 principal moment of, 42-8
 product of, 42-7, 70-2
 rectangular moment of, 42-3
 resistance, vehicle, 75-2
 vector, 70-2, 72-5 (ftn)
 Inertial
 force, 70-2, 72-5
 frame of reference, 71-10
 frame of reference, Newtonian, 71-10
 resisting force, vehicle, 75-2
 separator, 32-7, 34-7
 survey system, 78-7
 Infant mortality, 11-9
 Infective dose, 27-10
 Infiltration, 20-7 (ftn), 21-9, G-8
 capacity, 21-9
 sewer, 28-2
 test, double-ring, 21-9
 Infinite series, 3-11, 3-12 (ftn), 87-7
 Inflation, 87-39
 effect on cost, 86-7
 Inflection point, 7-2, 8-2
 assumed, 47-18
 deflection, 44-17
 flexible bulkhead, 39-4, 39-5
 Inflow, 28-2
 Influence
 chart, 40-2, 40-3
 cone, 40-2
 diagram, 41-10, 46-8, 46-9,
 46-11, 46-12, 46-13
 graph, 41-10
 line, 41-10
 radius of, 21-5, 31-6
 value, 40-2
 zone of, 40-2
 Influent, G-8
 stream, G-8
 Information
 cluster, 81-1
 header, 81-1
 Infrared
 incineration, 34-14
 testing, 43-12
 Inhalable fraction, 32-7
 Initial
 abstraction, 20-2, 20-18
 loss, G-8
 modulus, 48-5
 period, 73-20
 rate of absorption, 67-5
 value, 9-4, 10-1
 value problem, 10-1
 Injection
 sorbent, 34-20
 well, 34-11
 well installation, 34-11 (fig)
 Injured party, 88-6
 Injury
 incidence rate, 83-2
 log, 83-2 (ftn)
 occupational, 83-2
 Inlet
 control, 19-27
 curb, 28-5
 grate, 28-5
 gutter, 28-5
 pressure, net positive, 18-2 (ftn)
 Inline sampling, 22-24
 Inner transition element, 22-3
 Innovative method, 32-15
 Inorganic
 chemical, 28-14
 compound, volatile, 32-16
 salt, removal, in wastewater, 29-3
 Insecticide (*see also* Pesticide), 32-12
 Insensitivity, 85-2
 experiment, 11-12
 Inspection
 polynomial, 3-4
 radiographic, 82-4
 Instability, 85-2
 Instant center, 71-13
 Instantaneous
 center, 71-13
 center of acceleration, 71-14
 center of rotation, 66-7
 center of rotation method, 65-5, 65-6
 center, constrained cylinder, 72-12 (fig)
 deflection, 50-15

- growth, 3-11
 - reorder inventory, 87-44 (fig)
 - values, 71-2
- Instrument
 - coefficient of, 17-28
 - factor, 78-8
 - height, 78-10, 81-4
 - person, 81-4
 - telescopic, 78-5
- Insurance, 88-8
 - Services Office, 26-23
- Intangible property, 87-20 (ftn)
- Integral, 9-1, 9-2
 - combination of functions, 9-2
 - convolution, 10-6
 - cosine function, 9-8, 9-9
 - definite, 9-1 (ftn), 9-4
 - double, 9-3
 - elliptic function, 9-8 (ftn)
 - exponential function, 9-9
 - Fresnel function, 9-8 (ftn)
 - function, 9-8
 - gamma function, 9-8 (ftn)
 - hyperbolic function, 9-2
 - indefinite, 9-1, 9-4, A-10
 - sine function, 9-8
 - transcendental function, 9-1
 - triple, 9-3
- Integrand, 9-1
- Integrated gasification/combined cycle, 24-5
- Integrating factor, 10-2
- Integration, 9-1
 - by parts, 9-2
 - by separation of terms, 9-3
 - constant of, 9-1, 10-1
 - method, 42-1, 42-4
- Intensity
 - duration-frequency curve, 20-5
 - rainfall, 20-4
- Interaction
 - AISC equation (steel), 59-15
 - diagram, 52-5, 52-6
 - diagram, masonry wall, 68-10
 - diagram, reinforced
 - concrete, A-135, A-136, A-137, A-138, A-139, A-140, A-141, A-142, A-143, A-144, A-145, A-146, A-147, A-148, A-149, A-159, A-160, A-161, A-162, A-163, A-164
 - equation, 62-2
 - equation, flexural/force, 62-2
- Intercept, 7-5
 - cohesion, 35-26
 - form, 7-5
- Interception, G-8
- Interceptor, 28-3
- Interchange (*see also type*)
 - adaptability, 73-25 (fig)
 - all-directional, 73-25
 - cloverleaf, 73-25
 - diamond, 73-24
 - directional, 73-25
 - highway (*see also type*),
 - parclos, 73-23, 73-25
 - partial cloverleaf, 73-25
 - single-point diamond, 73-25
 - single-point urban, 73-25
 - trumpet, 73-25
 - type, 73-24 (fig)
 - urban, 73-25
- Interest
 - compound, 87-11
 - rate, effective, 87-5, 87-28
 - rate, nominal, 87-28
 - simple, 87-11
- Interfacial
 - area, 34-21
 - friction angle, 31-5 (tbl)
- Interference, 45-6
 - fit, 45-6
- Interflow, G-8
- Intergranular, 22-20
 - attack, 22-19
 - corrosion, 22-19
- Interior
 - angle, 78-13, 79-2
 - angle, curve, 79-2
 - intermediate stiffener, 63-3
- Intermediate
 - clarifier, 29-12
 - column, 45-4, 61-4
 - metals, law of, 85-7
 - stiffener, 44-19, 59-18, 63-4 (fig)
 - stiffener design, 63-4
 - temperatures, law of, 85-7, 85-8
- Intermittent
 - duty, 84-14
 - sand filter, 29-12
- Intern engineer, 90-1 (ftn)
- Internal
 - energy, 13-4
 - force, 41-2, 41-13, 72-2
 - friction, angle of, 35-17, 35-26, 40-7, 43-8, 72-6
 - rate of return, 87-12
 - work, 13-2, 43-6
- International
 - Code Council, 82-1
 - standard atmosphere, A-59
 - standard metric condition, 24-2
 - Union of Pure and Applied Chemistry (IUPAC), 23-1
- International*
 - Building Code*, 58-5 (ftn), 82-1
 - Fire Code*, 82-2
 - Mechanical Code*, 82-2
 - Plumbing Code*, 82-2
 - Residency Code*, 82-2
 - Zoning Code*, 82-2
- Interpolating polynomial, Newton's, 12-3
- Interpolation nonlinear, 12-2, 12-3
- Intersection
 - angle, 7-6, 7-8, 79-2
 - capacity, 73-14
 - crash factor, 75-10
 - element, 73-14
 - line, 2-1, 7-6
 - set, 11-1
 - signal warrant, 73-17
 - signalized, 73-14
- Interval
 - confidence, 78-2
 - contour, 78-22
 - pace, 73-4
 - proof test, 11-9
 - recurrence, 20-5
 - return, 20-5
 - stadia, 78-8
- Intrinsic
 - permeability, 21-2
 - waste, 32-2
- Intrusion, G-8
- Intrusive igneous rock, 35-32
- Invar, 78-8
 - rod, 78-9
- Inventory, 87-37
 - days supply on hand, 87-36
 - instantaneous reorder, 87-44 (fig)
 - load, 74-3
 - rating level, bridge, 74-3
 - supply, 87-36
 - turnover, 87-36
 - value, 87-37
- Inversability, 78-6
- Inverse
 - condemnation, G-8
 - function, 6-4
 - Laplace transform, 10-6
 - matrix, 4-6
 - square attractive field, 72-19
 - square repulsive field, 72-19
 - trigonometric operation, 6-4
- Inversing, 78-13
 - the line, 78-13
- Inversion
 - Fourier, 9-7
 - layer, G-8
 - lining, 40-11
- Invert, 19-27
- Inverted
 - bucket steam trap, 16-14
 - siphon, G-8
- Investment
 - credit, 87-25
 - external, 87-13
 - return on, 87-11, 87-14
 - risk-free, 87-11
 - tax credit, 87-25
- IOC, 28-14
- Iodine, 26-21
- Ion, G-8
 - bar chart, 25-1
 - common, effect, 22-13
 - electron method, 22-8 (ftn)
 - exchange process, 22-22, 26-17
 - exchange regeneration, 26-18
 - exchange resin, 22-22
 - exchange softening, 26-17
 - hydrogen, G-8
 - hydronium, G-8
 - product, 22-15
- Ionic concentration, 22-11, 22-12
- Ionization constant, 22-15
- Ionized HOCl fraction, 26-20
- Iron, A-116, A-117, A-118
 - bacteria, 27-6
 - ion, in water, 25-6, 26-15
 - loss, 84-17
 - pipe, A-44
 - pipe, dimensions, A-44
 - pipe, standard pressure
 - classes, A-44, A-45
 - removal process, 26-15
- Irradiation, 26-21
- Irrational real number, 3-1
- Irreducible factor, 87-2
- Irregular
 - area, 7-1 (fig)
 - boundary, 7-1
- Irreversible reaction, 22-13
- ISA nozzle, 17-32 (ftn)
- Isentropic
 - compressibility, 14-13
 - compression, 30-9
 - efficiency, 30-9
- Isocenter, 78-19
- Isogonic line, 78-12, G-8
- Isohyet, 20-2
- Isohyetal method, 20-2
- Isolated footing, 36-2
- Isolation joint, 77-12
- Isometric view, 2-3
- Isometry, 7-3
- Isopiestic equilibrium, 14-10 (ftn)
- Isothermal
 - compressibility, 14-13
 - compression, 15-13
- Isotope, 22-2, G-8
 - effect, 22-2 (ftn)
- Iteration, fixed-point, 12-2
- IUC name, 23-1
- IUPAC name, 23-1
- Izod test, 43-16

J

- J.B. Johnson formula, 45-4
- Jack, hydraulic, 15-15
- Jacking, 56-2
 - frost, 38-6
 - pipe, 40-11
- Jackson and Moreland alignment chart, 53-3 (fig), 61-3 (fig)
- Jacob's equation, 21-7

- Jam density, 73-6, G-9
 Jersey barrier, 75-13
 Jet
 force on blade, 17-35
 force on plate, 17-34
 propulsion, 17-34
 pump, 18-2
 Jib, 83-9, 83-10
 fixed, 83-9, 83-10
 fixed-angle, 83-9, 83-10
 luffing, 83-9, 83-10
 Job cost accounting, 87-36
 Johnson procedure, 45-3
 Joint (*see also type*), 41-12
 construction, 77-2, 77-12
 contraction, 77-11
 control, 77-11
 dummy, 77-11
 efficiency, 16-10, 45-12
 expansion, 77-12
 hinge, 77-12
 isolation, 77-12
 lap, 66-2
 lap, bolted, 45-10
 pavement, 77-11
 pavement, concrete, 77-11 (fig)
 probability, 11-3
 processing, 28-2
 quality factor, 16-10
 reinforcement, 67-7
 spacing, 77-11
 warping, 77-12
 weakened plane, 77-11
 Jointed
 concrete pavement, 77-2
 reinforced concrete pavement, 77-2
 Joints (*see also type*)
 method of, 41-14
 Joist, 59-2
 construction, 50-21
 Joule, 1-5, A-3
 equivalent, 13-1
 Joule's
 constant, 13-1
 law, 13-5
 Journal, 87-33
 Judgment factor, 87-2
 Jump, hydraulic, 16-9 (ftn), 19-23, G-8
 Junction, 85-6
 Juvenile water, G-9
- K**
- K**
 -out-of-*n* system, 11-10
 -rail barrier, 75-13
 -value, 45-20, 77-5, 77-6 (tbl)
 -value method, 79-15
 -waste, 32-2
 KABCO severity scale, 75-16
 Karman-Nikuradse equation, 17-5
 Kepler's law, 72-20
 Kern, 44-13, 69-3
 cross section, 44-13 (fig)
 Kernel, 44-13
 Kerosene
 equivalent, centrifuge, 76-14
 Ketone, 23-3 (tbl)
 Key, 37-1 (ftn)
 component, 34-21
 Kick-out, toe, 39-5
 Kilograin (unit), 26-17 (ftn)
 Kilogram, 1-1
 Kilowatt
 -hours, 18-10
 hydraulic, 18-8 (tbl)
 Kinematic
 equation, Manning, 20-3
 GPS surveying, 78-6
 indeterminacy, degree of, 47-10
 viscosity, 14-8, 16-7
 wave formula, 20-4
- Kinematics, 71-1
 Kinetic
 energy, 1-3, 13-3, 16-1
 model, CSTR, 30-6
 model, PFR, 30-6
 pump, 18-2
 Kinetics, 72-2
 reaction, 22-14
 reaction, irreversible, 22-13
 reaction, reversible, 22-14
 Kingdom, 27-4, G-9
 Kip, A-3
 Kirchhoff's voltage law, 84-3
 Kjeldahl nitrogen, 28-14
 kmol, 22-5
 Kneading compactor, 76-14
 Knock resistance, 24-6
 Knoop test, 43-13
 Knot, 79-21
 Knudsen number, 1-9 (tbl)
 Korteweg formula, 17-39
 Krause process, G-9
 Kuchling's formula, 26-24 (ftn)
 Kurtosis, 11-14
 excess, 11-14
 Fisher's, 11-14
 Pearson's, 11-14
 Kutta-Joukowski
 result, 17-41
 theorem, 17-41
 Kutter equation, 19-4 (ftn)
 kVA rating, 84-14
- L**
- L'Hôpital's rule, 3-9
 Label
 classified, 82-3
 listed, 82-3
 UL, 82-3
 Labor
 direct, 87-32
 variance, 87-36
 Laboratory
 settling column test, 26-6
 strength, pipe, 40-9
 Laborer's lien, 88-5
 Laced column, 61-2 (ftn)
 Lacing bar, 61-2 (ftn)
 Lag
 equation, NRCS, 20-4
 equation, SCS, 20-11
 phase, 27-3
 time, 20-11
 Lagging, G-9
 circuit, 84-7
 storm method, 20-13
 Lagoon
 aerated, 29-5
 stabilization, 29-4
 Lagrange stream function, 17-4
 Lagrange's formula, 5-5
 Lagrangian interpolating polynomial, 12-2
 Lake
 dimictic, G-5
 meromictic, G-9
 monomictic, G-10
 polymictic, G-11
 Lamé's solution, 45-5
 Lamella plate, 26-6
 Laminae, 16-7
 Laminar
 flow, 16-7, 17-5
 tube, 26-6
 Lamp hole, G-9
 Land ban, 33-2
 Landfill, 31-2
 cap, 31-5
 capacity, 31-3
 containment, 31-2
 gas, 31-5
 monitoring, 31-9
- natural attenuation, 31-2
 siting, 31-5
 sludge, 30-20
 Subtitle C, 31-3
 Subtitle D, 31-3
 Landing speed, 79-21
 Landvault, 31-2
 Lane
 and shoulder adjustment factor, 73-13
 auxiliary, G-2
 Class III, 73-12
 distribution, 73-6
 distribution factor, 76-17, 76-18 (tbl)
 encroachment, 79-20
 group, critical, 73-15
 loading, 76-18
 median, G-9
 occupancy ratio, G-9
 Lang lay, 45-22
 Langelier
 saturation index, 26-18
 stability index, 26-18
 Lanthanide, 22-3
 Lanthanone, 22-3
 Lanthanum, 22-3 (ftn)
 Lap
 joint, 66-2
 joint, bolted, 45-10
 length, wire, 67-7
 Laplace transform, 10-5, A-11
 of a derivative, 10-6
 table, A-11
 inverse, 10-6
 Lapse rate, G-9
 dry, G-9
 wet, G-9
 Large eccentricity, 52-6
 Last-in, first-out method, 87-38
 Latency, 27-10
 Lateral, G-9
 acceleration, rate of increase, 79-18
 bracing, 59-3
 buckling, 44-19
 buckling, in beam, 59-3 (fig)
 buckling, flange support, 44-19 (fig)
 earth pressure, coefficient, 38-3
 load, stiffness reduction factor, 53-4
 offset between tangent and curve, 79-21
 pressure on formwork, 49-8
 ratio, 79-7
 spreading cracking, pavement, 76-5
 strain, 43-4
 support, 59-3
 tie, masonry column, 69-2
 torsional buckling modification
 factor, 59-4
 Latex
 -modified concrete, 77-13
 synthetic, 76-5
 Lath, 81-1
 Latitude, 78-13 (fig)
 Lattice bar, 61-2 (ftn)
 Latticed column, 61-2 (ftn)
 Latus rectum, 7-10, 7-11
 Launching, 75-13
 Lava, G-9
 Law
 Abrams', strength, 48-4
 affinity, 18-18
 associative, addition, 3-3
 associative, multiplication, 3-3
 Avogadro's, 22-5, G-2
 commutative, addition, 3-3
 commutative, multiplication, 3-3
 conservation of momentum, 17-33
 Dalton's, 24-14, 31-6
 Darcy's, 21-3, 31-7, 35-23
 distributive, 3-3
 Green's, 2-4
 Henry's, 34-21
 Hess', 22-18
 Hooke's, 43-2, 44-2, 45-20, 85-11

- Joule's, 13-5
- Kepler's, 72-20
- Newton's first, 72-4
- Newton's second, 72-4
- Newton's third, 72-5
- Newton's, gravitation, 72-20
- Law of
 - areas, 72-20
 - conservation of energy, 13-1
 - conservation of momentum, 72-2
 - cooling, Newton's, 10-10
 - cosines, 6-5
 - cosines, first, 6-6
 - cosines, second, 6-6
 - definite proportions, 22-4
 - homogeneous circuits, 85-7
 - induction, Faraday's, 17-27
 - intermediate metals, 85-7
 - intermediate temperatures, 85-7, 85-8
 - mass action, 22-13, 22-15
 - motion, Newton's, 26-5
 - multiple proportions, 22-4
 - orbits, 72-20
 - periods, 72-20
 - planetary motion, 72-20
 - sines, 6-5, 6-6
 - tangents, 6-5
 - Pascal's, 15-4
 - periodic, 22-2
 - Raoult's, 14-16
 - set, 11-1
 - similarity, 18-20
 - Stokes', 17-42, 26-5
- Laws, scaling, 18-20
- Lay, 2-4
 - lang, 45-22
 - regular, 45-22
- Layer
 - boundary, 16-8 (ftn)
 - coefficient, 76-22
 - impervious, G-8
 - inversion, G-8
 - material strength, 77-5
 - strength, 76-20
 - strength coefficient, 76-24 (tbl)
 - thickness determination, 76-24 (fig)
 - thickness equation, 76-22
 - geological strata, 83-3
- Layered
- lbmol, 22-5
- Le Châtelier's principle, 22-13
- Leachate, 31-7
 - carbon dioxide in, 31-9
 - generation rate, 31-7
 - migration, 31-7
 - recovery, 31-8
 - treatment, 31-8
- Leaching
 - cesspool, 29-2
 - characteristic, toxicity, 32-2
 - selective, 22-19
- Lead, 32-9
 - angle, bolt, 45-14
- Leading circuit, 84-7
- Leak detection and repair program (LDAR), 32-8
- Learning curve, 87-43
 - constant, 87-43 (tbl)
 - rate, 87-43
- Least
 - radius of gyration, 42-6, 61-4
 - squares, balancing, 78-15
 - squares method, 11-16, 78-15
- Ledger
 - account, 87-33
 - general, 87-33
- Left distributive law, 4-4
- Leg, pipe, 17-21
- Legal
 - load, 74-3
 - rating level, bridge, 74-3
 - speed, 73-3
- Legal speed limit, 73-3
- Legendre equation, 10-5
- Legionella, 32-4
- Legionnaires' disease, 32-4
- Length, 2-2
 - arc, 71-8
 - arc, by integration, 9-5
 - characteristic, 19-18
 - chord, 17-40
 - conversion, SI, A-3, A-4
 - curve, 79-3
 - curve, comfort, 79-17
 - cycle, 73-16, 73-17
 - desirable, spiral curve, 79-21
 - development, 55-5, 57-6
 - effective, 61-3
 - effective, column, 45-3
 - equivalent, 17-12
 - equivalent, straight pipe, fittings, A-56
 - minimum splice, 67-7
 - of hydraulic jump, 19-26
 - platoon, 73-20
 - ratio, 17-45
 - roughness sampling, 2-4
 - scale, 19-18
 - spread, 76-7
 - taper, 73-32
 - weaving segment, 73-26
 - wire lap, 67-7
- Leptokurtic distribution, 11-14
- Leptothrix, 27-6
- Letter of agreement, 88-3
- Level
 - action, 83-8
 - compensation, G-4
 - confidence, 11-14
 - dummy, 78-9
 - engineer's, 78-9
 - geodetic, 78-10
 - maximum contaminant, 28-15
 - of accuracy, 78-4
 - of reliability, 76-20 (tbl)
 - of service, 73-3, 73-8, 73-21
 - of service criteria, multilane
 - highway, 73-11 (tbl)
 - of service, freeway, 73-8 (tbl)
 - of service, primary measure of, 73-4 (tbl)
 - piezometric, G-11
 - precise, 78-10
 - prism, 78-10
 - semi-precise, 78-10
 - significance, 11-14
 - survey, 78-9
 - surveying, 78-9
 - tangent resistance, 75-5
- Leveler, 81-4
- Leveling, 78-9
 - differential, 78-10
 - direct, 78-9, 78-10 (fig)
 - indirect, 78-11, 78-12 (fig)
 - resource, 86-10
 - rod, 78-10
- Lever, 41-10, 41-11 (fig)
 - effectiveness, 15-16
 - efficiency, 15-16
- Leverage, 87-35
- Lewis number, 1-9 (tbl)
- LFR method, 74-3
- Liability
 - account, 87-33
 - current, 87-35
 - in tort, 88-7
 - limited, company, 88-2
 - long-term, 87-35
- Licensing, 90-1
 - exam, 90-3
- LIDAR, 78-6
- Lien
 - construction, 88-5
 - laborer's, 88-5
 - materialman's, 88-5
 - mechanic's, 88-5
- perfecting, 88-5
- supplier's, 88-5
- Life
 - analysis, economical, 87-4
 - cycle, 86-7
 - cycle cost, 87-15, 87-20
 - cycle cost analysis, 86-7
 - cycle assessment, 86-7
 - design, 76-19
 - economic, 87-19, 87-20
 - equivalent investment, 87-39 (ftn)
 - fatigue, 43-9
 - half-, 22-14
 - Safety Code, 82-1
 - service, 87-20
 - useful, 87-20
 - water treatment plant, 26-2
- Lifetime rate, 84-7 (ftn)
- Lifetime, water treatment plant, 26-2
- Lift, 17-39, 31-3, 35-18
 - angle chart, 83-11
 - capacity chart, 83-11
 - check valve, 16-12
 - coefficient of, 17-40
 - range chart, 83-11
 - rotating cylinders, 17-41
 - table, crane, 83-11
 - thickness, asphalt pavement, 76-8
- Lifting
 - equation, NIOSH, 83-7
 - index, 83-7
 - velocity, water, 21-5
- Light
 - detection and ranging unit, 78-6
 - distance, 79-16
 - metal, 22-3
 - sensitive detector, 85-4
- Lightweight
 - aggregate, 48-7
 - aggregate factor, 48-6 (tbl), 50-16, 55-2, 55-5
 - concrete, 48-4, 48-6, 48-7
- Lignite coal, 24-4
- Limb
 - falling, 20-7
 - rising, 20-7
- Lime, 26-9
 - hydrated, 26-15
 - milk of, 26-15
 - slaked, 26-15
 - soda ash process, 26-15
 - softening, 26-15 (ftn)
- Limestone, sweetening with, 48-2
- Limit, 3-9
 - Atterberg, 35-3, 35-21
 - class, 11-10
 - confidence, 11-15
 - elastic, 43-3
 - endurance, 43-9
 - liquid, 35-21
 - plastic, 35-21
 - proportionality, 43-3
 - shrinkage, 35-21
 - simplifying, 3-9
 - state, 74-4 (ftn)
 - state design, 59-8
 - state, service, 56-7
 - states, 58-5
- Limited
 - liability company, 88-2
 - liability partnership, 88-2
- Limiting
 - current, sensor, 85-4
 - reactant, 22-9
 - value, 3-9
- Limnetic, G-9
- Limnology, G-9
- Lindane, 32-12
- Line, 6-1 (ftn), 7-3
 - agonic, G-1
 - balance, 80-7 (fig)
 - centroid of a, 42-3

- contour, 78-22
 current, 84-11
 daylight, 81-4
 dredge, 39-2
 energy, 16-8 (ftn)
 energy grade, 16-8, 17-15
 equipotential, 17-3, 21-7
 failure, 35-26
 flow, 21-7, 29-2
 grade, 80-3
 hydraulic grade, 16-8, 17-16
 influence, 41-10
 intersection, 2-1, 7-6
 isogonic, 78-12, G-8
 mud, 39-2, G-10
 neat, 80-10
 net, 80-10
 normal vector, 8-6
 of action, 5-1, 41-2
 perpendicular, 2-1
 pull, 83-10
 rupture, 35-26
 straight, 7-4 (fig)
 surcharge, 37-8
 virgin compression, 35-24
 waiting, 73-27
 zero haulage, 80-6
- Lineal**, 1-8
 measurement, 1-8
- Linear**, 1-8
 acceleration, 71-4
 algebra, 4-4 (ftn)
 deformation, 47-3
 displacement, 71-3
 elastic analysis, 47-2
 elastic analysis, second-order, 47-2
 equation, 3-6, 3-7
 equation, differential, 10-1
 equation, graphing, 3-7
 equation, reduction, 3-7
 equation, simultaneous, 3-6, 3-7
 equation, substitution, 3-7
 expansion, coefficient, 44-3, 44-4
 first-order, 10-2
 force system, 41-4 (fig)
 frequency, 84-4
 growth rate, 3-11
 impulse, 72-14
 momentum, 17-33, 72-2
 motion, 71-2
 particle motion, 71-2
 regression, 11-16
 second-order, 10-3
 spring, 13-2 (ftn)
 system, 71-2
 thermal expansion, coefficient, 44-4 (tbl)
 variable differential transformer, 85-4
 velocity, 21-4
 velocity-dependent force, 72-18
 yield, paving, 76-7
- Linearity**, 10-6
- Lined concrete pipe**, 16-10
- Liner**
 clay, 31-4
 double, 31-3
 flexible membrane, 31-3, 31-4
 geocomposite, 31-4
 -plate cofferdam, 39-8
 synthetic membrane, 31-4
- Lines**, angle between, 6-1
- Lining**
 ditch, fabric, 80-11
 pipe, 16-11
- Lintel**, 59-2
- Lipid**, G-9
- Lipiphilic**, G-9
- Liquefaction**, 40-11
- Liquefied petroleum gas**, 24-8
- Liquid**
 aromatic, 14-10 (ftn)
 asset, 87-35
 fuel, 24-5
 -gas ratio, venturi scrubber, 34-18
 immiscible, 15-12
 incineration, 34-14
 limit, 35-21
 penetrant testing, 43-12
 pore-squeeze, 31-7
 thixotropic, 14-7
 volatile, 14-10, 22-11 (ftn)
- Liquidated damages**, 88-7
- Liquidity**, 87-35
 index, 35-22
- Liquor**, mixed, 30-2
- List**, 15-18 (ftn)
- Listed**
 label, 82-3
 product, 82-3
- Liter**, 1-6
- Lithium-based admixture**, 48-2
- Lithotroph**, 27-4
- Littoral**, G-9
- Live load**, 45-2 (ftn), G-9
 factor, 74-4
 model, 74-3
- Lloyd-Davies equation**, 20-14 (ftn)
- Load**
 allowance, dynamic, 74-4
 and resistance factor
 design, 58-5, 59-8, 74-3 (ftn)
 and resistance factor rating method,
 bridge, 74-4
 block, 83-10
 buckling, 53-5, 61-2
 -carrying wall, 54-2
 cell, 85-12
 chart, crane, 83-11
 combination, 50-3
 composite, 57-3
 dead, 41-5, G-5
 -deformation compatibility, 66-4
 distributed, 41-5
 distributed, beam, 41-5 (fig)
 distributed, moment, 41-6
 dominant, 46-14
 duration factor, 59-17 (ftn)
 -elongation curve, 43-2
 equivalency factor, 76-17
 Euler, 61-2
 factor (haulage), 40-9, 45-2, 50-3, 80-1
 factor design method, 45-2, 59-8
 factor rating method, bridge, 74-3
 factor, bedding, 40-9
 factor, jacking force, 50-4
 factored, 50-3
 impact, 44-8
 inventory, 74-3
 live, 45-2 (ftn), G-9
 moving, 46-14
 noncomposite, 57-3
 operating, 74-3
 overhung, 18-11
 permit, 74-3
 posted, 74-3
 posting, 74-2
 proof, bolt, 45-9, 45-13
 rating, bridge, 74-2
 service, 45-2, 50-3
 shock, septage, 29-2
 superposition, 41-16
 thermal, 47-3
 transfer, 77-7
 transfer coefficient, 77-7
 transverse, truss member, 41-16 (fig)
 transverse, truss, 41-16
 truck, 76-18
 ultimate, 47-2
 vector, 47-12
- Loaded tire radius**, 75-3
- Loader**, low-lift, 76-7
- Loading**
 axial, 44-12
 BOD, 28-9, 29-9
 chemical, 34-23
 coefficient, buried pipe, 40-8
 concentric, 44-12
 curve, trapezoidal, 41-6
 distributed, 41-5 (fig)
 dust, 34-5
 eccentric, 44-12
 error, 85-2
 fabric, 34-5
 factor, 31-3
 HL-93, 76-19 (fig)
 hydraulic, 28-3, 29-10, 34-23
 impact, 44-7, 44-8
 lane, 76-18
 organic, 28-3, 29-9
 pump shaft, 18-11
 rate, 26-13
 sewage treatment plant, 28-3
 steel, 58-5
 surface, 26-6, 29-7, 29-8
 transverse, 41-16
 volumetric, 30-8
 weir, 26-6, 29-7
- Loadometer**, 76-17
- Loads on buried pipe**, 40-8
- Loan**, 87-40
 constant amount paid toward
 principal, 87-41 (fig)
 direct reduction, 87-41 (fig)
 direct reduction, balloon
 payment, 87-42 (fig)
 repayment, 87-4
 repayment problem, 87-4
 simple interest, 87-40
- Local**
 buckling, 44-19, 59-17 (fig), 61-2, 61-6
 loss, 17-12, A-57
 regulations, 82-2
 road, 73-3
 shear failure, 36-2
- Location**
 effect on cost, 86-7
 landfill, 31-5
 parameter, 11-8
 stake, 81-5 (fig)
 water treatment plant, 26-2
- Locomotive**
 diesel-electric, 75-5
 resistance, 75-4
 tractive force, 75-4
- Locus of points**, 7-2
- Loess**, G-9
- Log**
 -spiral theory, 37-3
 injury, 83-2 (ftn)
 -linear form, 3-11
 mean, 11-8
 -normal distribution, 11-8
 standard deviation, 11-8
 strain, 43-5
- Logarithm**, 3-5
 common, 3-5
 identity, 3-5
 Napierian, 3-5
 natural, 3-5
- Logarithmic growth phase**, 27-4
- Logistic**
 equation, 27-4
 growth rate constant, 27-4
- Long**
 column, 52-1, 53-1, 61-4
 hydraulically, 19-27
 stress, 45-5
 -term deflection, 50-17
 -term deflection factor, 56-3
 -term deformation, 50-17
 -term liability, 87-35
 ton, 1-7
- Longitudinal stress**, 45-5
- Loop**, 73-25
 pipe, 17-21
 ramp, 73-25

Loose
 cubic yard, 80-1
 -measure, 80-1

LOS
 criteria, signalized
 intersection, 73-15 (tbl)
 criteria, two-lane highway, 73-13 (tbl)
 performance criteria, 73-12

Los Angeles Abrasion test, 76-4

Loss
 coefficient, 17-12, 17-13 (tbl), 17-14
 coefficient, minor entrance, 19-28
 combustible, 24-16
 creep, 56-4
 dry flue gas, 24-16
 during transport, 80-9
 electrical machine, 84-17
 entrance, culvert, 17-20 (tbl)
 factor, pulley, 41-11
 heat, 30-17
 initial, G-8
 local, 17-12, A-57
 lump-sum, 56-4
 lump-sum, AASHTO, 56-4
 method, 24-17
 minor, 17-12, A-57
 prestress/pre-tension, 56-3
 radiation, 24-16
 relaxation, 56-4
 shrinkage, 56-4
 time-dependent, 56-4

Lost
 time, 73-15
 time case rate, 83-2
 work, 17-4 (ftn)
 workday rate, 83-2

Lot, parking, 73-22
 dimensions, 73-23

Low
 -alkali cement, 48-2
 -cycle fatigue, 43-9
 excess-air burner, 34-15
 -heat portland cement, 48-2
 -lift loader, 76-7
 -lift safety valve, 16-12
 NOx burner, 34-15
 -rate filter, 29-8
 -strength material, controlled, 48-8
 -sulfur coal, 24-5

Lower
 bound, 9-4
 confidence limit, 78-2
 heating value, 24-14

Lowest achievable emission rate, 34-2

LPG, 24-8

LRFD, 58-5, 74-3 (ftn)

Lubricant, viscosity, A-24

Luffing jib, 83-9, 83-10

Lump
 coal, 24-4
 -sum fee, 88-5
 -sum loss, 56-4

Lyophilic, 14-12

Lyophobic, 14-12

Lysimeter, G-9

Lysosome, 27-2

M

M/M/1 single-server model, 73-28

M/M/s multi-server model, 73-29

MAAT, 76-16

Macadam, 76-10

Mach number, 1-9 (tbl), 14-15

Machine, 41-20
 -drilled micropile, 38-6
 electric, 84-16

Machinery arm, crane, 83-10

Maclaurin series, 8-8

MacPherson versus Buick, 88-7 (ftn)

Macrofouling, 27-8

Macrophyte, 25-7

Macroporous resin, 26-17

Macroreticular
 resin, 26-17
 synthetic resin, 22-22

MACRS depreciation factor, 87-22 (tbl)

Magma, 35-32, G-9

Magnet, 17-27

Magnaflex process, 43-12

Magnaglow process, 43-12

Magnesia, 24-3 (ftn)

Magnesium, A-116, A-117, A-118
 hardness, 25-3
 structural, A-115

Magnetic
 azimuth, 73-30
 declination, 78-12
 flowmeter, 17-27
 meridian, 78-12
 particle testing, 43-12, 82-4

Magnification, moment, 53-1

Magnifier
 flexural, 62-2
 moment, 53-5

Magnus effect, 17-41

Main, G-9
 force, 28-4, G-6
 sewer, 28-2

Major
 axis, 7-11, 59-2, 61-4
 plant, 28-3
 source, pollution, 32-2
 weave segment, 73-26

Make
 -or-break valve, 16-14
 -up water, 22-23

Malodorous, G-9

Malthusian growth, 3-11

Management
 project, 86-1
 safety, technique, 75-10
 schedule, 86-9

Manager, construction, 88-5

Maney formula, 45-13

Manganese
 ion, in water, 25-6, 26-15
 removal process, 26-15

Manhole, 28-5

Manning's
 equation, 19-4
 formula, 19-4
 kinematic equation, 20-3
 overland roughness coefficient, 20-4
 retardance roughness coefficient, 20-4
 roughness coefficient, 19-4, 20-3, A-73
 roughness constant, 19-4, 19-5,
 A-73, A-75
 roughness variable, A-73, A-75

Manometer, 15-2, 15-3 (fig)
 differential, 15-3
 open, 15-3

Mantissa, 3-5

Manual
 bookkeeping system, 87-33 (ftn)
 total station, 78-5

*Manual on Uniform Traffic Control
 Devices*, 73-2, 73-17

Manufactured gas, 24-8 (ftn)

Manufacturer's margin, 24-16

Manufacturing cost, 87-33

Map
 scale, 78-21
 symbols, 78-21 (fig)
 topographic, 78-21 (fig)

Mapping
 aerial, 78-18
 function, 7-3

Marble, 35-32

Margin
 boiling-point, 32-8
 gross, 87-36
 manufacturer's, 24-16

Market value, 87-23

Marketing expense, 87-33

Marking, stake, 81-1

Marl, G-9

Marshall
 mix design, 76-10, 76-12 (tbl)
 mix design test, 76-12 (fig)
 mix test procedure, 76-11, 76-11 (fig)
 stability, 76-10

Marshland survey, 78-5

Marston coefficients, 40-8

Marston's formula, 40-8

Martensitic stainless steel, 22-19 (ftn)

Masking, 34-19

Masonry
 absorption, 67-5
 column, 69-1
 compressive strength, 67-3
 density, 15-12 (ftn)
 embedment length, 67-6
 horizontal cross sections, section
 properties, A-153, A-154,
 A-155, A-156
 mortar, 68-3
 partially grouted, 68-6
 plain, 68-1
 properties, 67-3
 unit, 67-1
 unreinforced, 68-3
 wall, 68-1
 wall interaction diagram, 68-10
 wire, 67-7
 wire lap length, 67-7

Mass, 1-1, 70-1
 action, law of, 22-13, 22-15
 burning, 31-10
 center of, 70-1
 conversion, SI, A-3, A-4
 curve, 20-2
 diagram, 20-21, 80-6, 80-8
 flow rate per unit area, 16-7
 fraction curve, 26-6
 liquid, transfer, coefficient, 34-21
 moment of inertia, 70-2, A-165
 of sludge, water treatment, 26-12
 sludge, 26-12, 30-13
 -to-power ratio, 75-8
 -transfer coefficient, 34-21
 varying, 72-19
 yield, 31-11

Mast, tower crane, 83-10

Master text, 82-11

Mastic, split, 76-28

Mat, 36-9

Material
 anisotropic, 5-1
 breach, 88-6
 cementitious, 48-1
 colloidal, 14-7
 direct, 87-32
 ductile, 43-6
 engineering, type, 43-2 (fig)
 hard, 43-1
 low-strength, controlled, 48-8
 mechanics, 44-2
 notch-brittle, 43-6 (ftn)
 orthotropic, G-10
 pipe, 16-9
 plastic, 14-7
 raw, 87-33
 recovery facility, 31-11
 resilient, 43-7
 safety data sheet, 83-4, 83-5
 soft, 43-1
 strength, 44-2, 77-5
 strong, 43-1
 tough, 43-7
 variance, 87-36

Materialman's lien, 88-5

Matrix, 4-1
 algebra, 4-4
 associative law, 4-4
 augmented, 4-1

- coefficient, 4-6
- cofactor, 4-1
- column, 4-1
- commutative law, 4-4
- complex, 4-1
- constant, 4-6
- costing, 86-6
- diagonal, 4-1
- distributive law, 4-4
- division, 4-4
- echelon, 4-1
- element, 4-1
- entry, 4-1
- equality of, 4-4
- identity, 4-1
- inverse, 4-6
- multiplication, 4-4
- nonsingular, 4-5
- null, 4-1
- order, 4-1
- precedence, 86-10
- rank, 4-5
- row, 4-1
- row equivalent, 4-2
- row-reduced echelon, 4-1
- scalar, 4-1
- simultaneous equations, 4-6
- singular, 4-2, 4-5
- skew symmetric, 4-2
- square, 4-2
- symmetric, 4-2
- transformation, 5-3
- triangular, 4-2
- type, 4-1
- unit, 4-2
- variable, 4-6
- zero, 4-2
- Matter
 - mineral, 24-3
 - volatile, 24-4
- Maturation pond, 29-4
- Maturity date, 87-29
- Maxima point, 8-2
- Maximum
 - achievable control technology, 34-2
 - capacity, traffic, 73-6
 - contaminant level, 25-6, 28-15
 - dry density, 35-18
 - flame temperature, 24-15 (ftn)
 - flood, probable, 20-6
 - flow, 73-6
 - fluid velocity, 17-3
 - freeway service flow rate, 73-8 (tbl)
 - moment, 44-9, 50-9 (fig)
 - moment condition,
 - period, 73-20
 - plastic moment, 59-13 (tbl)
 - point, 8-2
 - precipitation, probable, 20-6
 - prestress, 56-6
 - rainfall, probable, G-11
 - service flow rate, 73-5
 - shear envelope, 47-20
 - shear stress theory, 43-8
 - slenderness ratio, steel tension
 - member, 60-4
 - specific gravity, 76-9
 - specific growth rate, 30-7
 - specific growth rate coefficient, 28-6
 - stress, with and without shoring, 64-2
 - theoretical combustion
 - temperature, 24-15
 - total uniform load table, 59-8
 - value, sinusoid, 84-4
 - velocity in pipe, 17-3
 - velocity, open channel, 19-26
 - water-cement ratio, 77-2 (tbl)
 - yield coefficient, 28-6
- MCL, 25-6, 28-15
- MCLG, 25-6
- Mean, 11-12, 34-9
 - annual air temperature, 76-16
 - arithmetic, 11-12
 - cell residence time, 30-5, 30-8
 - depth, hydraulic, 19-2 (ftn)
 - effective pressure, 85-14
 - fourth moment of, 11-14
 - free path, 34-9
 - geometric, 11-12
 - harmonic, 11-12
 - number, M/M/s system, 73-29 (fig)
 - residence time, 29-7, 32-9
 - sea level, 78-7
 - slip coefficient, 65-3
 - speed, 73-3, 73-4, G-13
 - standard error of, 11-14
 - stress, 43-9
 - third moment about, 11-14
 - time before failure, 11-9 (ftn)
 - time to failure, 11-9
 - velocity, open channel, 19-2
- Meander corner, G-9
- Meandering stream, G-9
- Measure
 - bank-, 80-1
 - compacted-, 80-1
 - loose-, 80-1
- Measurement
 - angle, 78-13 (fig)
 - areal, 1-8
 - board foot, 1-8
 - crow's foot, 81-3
 - distance, 78-7, 78-8
 - elevation, 78-9, 78-10, 78-11
 - flow, 17-26, 26-3
 - ground stake, 81-1
 - guard stake, 81-1
 - horizontal stadia, 78-8 (fig)
 - hub stake, 81-1
 - inclined stadia, 78-8 (fig)
 - offset stake, 81-3
 - reference point stake, 81-1
 - reliable, 85-2
 - ton, 1-7
 - witness stake, 81-1
- Mechanic's lien, 88-5
- Mechanical
 - advantage, 15-16, 41-11
 - advantage, pulley block, 41-11
 - advantage, rope-operated
 - machine, 41-11 (tbl)
 - property, high-performance steel
 - plate, 58-6 (tbl)
 - property, steel, 48-9
 - seal, 34-16
 - similarity, 17-45
- Mechanics
 - engineering, 41-1
 - material, 44-2
 - space, 72-21
- Mechanism, 41-20, 47-2
 - method, 59-8
 - two-dimensional, 41-20
- Mechanistic
 - empirical design, 77-11
 - empirical method, 76-16
 - method, 76-16
- Media
 - factor, 29-11
 - packing, 34-20
- Median, 11-12, G-9
 - barrier, heavy vehicle, 75-13 (fig)
 - lane, G-9
 - speed, 73-4
- Medium
 - cure, asphalt, 76-2
 - screen, wastewater, 29-6
- Megagram, 1-6
- Meinzer unit, 21-2
- Member
 - axial, 41-11
 - axial, force, 41-12
 - circular, 50-21
 - force, 41-16
 - pin-connected, axial, 41-12
 - redundant, 41-7, 41-13
 - set, 11-1
 - tension, 60-1 (fig)
 - tension, staggered holes, 60-2 (fig)
 - tension, uniform thickness, unstaggered
 - holes, 60-2 (fig)
 - tension, unstaggered row of
 - holes, 60-2 (fig)
 - three-force, 41-7
 - two-force, 41-6, 41-12
 - zero-force, 41-14 (fig)
- Membership interest, 88-3
- Membrane
 - cell, 27-2
 - pumping, 27-3
 - reinforced, 31-4
 - semipermeable, 14-10
 - support, 40-10
 - supported, 31-4
 - synthetic, 31-4
 - unreinforced, 31-4
 - unsupported, 31-4
- Meniscus, 14-12
- Mensuration, 7-1, A-7
 - area, A-3, A-5
 - pile, 80-4
 - three-dimensional, A-9
 - two-dimensional, A-7
 - volume, A-9
- MEP, 85-14
- Mer, 26-8
- Mercaptan compound, 27-9
- Mercury, density, 14-3 (tbl)
- Merging taper, 73-32
- Meridian, 78-12, 78-20 (fig), G-9
 - assumed, 78-12
 - grid, 78-12
 - magnetic, 78-12
 - true, 78-12
- Meromictic lake, G-9
- Mesa, G-9
- Mesh, steel, A-134
- Mesokurtic distribution, 11-14
- Mesophile, 27-6 (tbl)
- Mesophilic bacteria, G-9
- Metabolism, 27-9, G-9
- Metacenter, 15-18
- Metacentric height, 15-18
- Metal, 22-2, 22-3
 - active gas welding, 66-2
 - alkali, 22-3
 - alkaline earth, 22-3
 - base, 66-1
 - concentration, 28-15
 - deck system, 57-4
 - deck, filled, 57-4
 - deck, orthotropic, 57-4
 - deck, partially filled, 57-4
 - deck, unfilled composite, 57-4
 - filler, 66-1
 - heavy, 22-3, 28-14
 - heavy, in wastewater, 28-14
 - inert gas welding, 66-2
 - light, 22-3
 - mechanical properties, A-116, A-117, A-118
 - total, in wastewater, 28-14
 - transition, 22-3 (ftn)
 - weld, 66-1
- Metalimnion, G-9
- Metallic property, 22-2
- Metalloid, 22-2, 22-3
- Metamorphic rock, 35-32, G-9
- Metathesis, 22-7 (ftn)
- Meteoric water, G-9
- Meter
 - constant, 17-29
 - current, 17-27
 - density-on-the-run, 76-8
 - displacement, 17-26
 - normal cubic, 24-2

obstruction, 17-26
 orifice, 17-30 (fig)
 pressure, 14-2 (ftn)
 torque, 85-13
 turbine, 17-27
 variable-area, 17-27
 venturi, 17-29, 17-30 (fig)
 Metering pump, 18-3
 Methane
 gas, 30-16
 heating value, 30-17
 landfill, 31-6
 properties, 31-6 (tbl)
 series, 24-1
 sludge, 30-16
 Methanol, 24-7
 Methemoglobinemia, 25-8
 Method (*see also type*)
 60-degree, 40-2
 α -, 38-3
 absolute volume, concrete, 77-2
 accelerated depreciation, 87-22
 allowable stress design, 45-2, 50-2
 angle measurement, 78-12
 annual cost, 87-15
 annual return, 87-15, 87-16
 area transformation, 44-19
 average cost, 87-38
 average end area, 80-4
 base exchange, 26-17
 benefit-cost ratio, 87-16
 beta-, 38-4
 bisection, 3-4, 12-1
 Bowditch, 78-15
 capital recovery, 87-15, 87-16
 capitalized cost, 87-15
 Casagrande, 35-25
 chord offset, 79-6
 compatibility, 46-2
 consistent deformation, 46-2
 constant percentage, 87-21
 Crandall, 78-15
 crash estimation, HSM, 75-16
 cut-and-sum, 41-15
 deflection angle, 79-4
 direct design, 51-5, 51-6
 displacement, photogrammetry, 78-19
 double declining balance, 87-21
 double meridian distance, 78-17
 double-entry bookkeeping, 87-33 (ftn)
 dummy unit load, 46-7
 elastic, 66-5, 66-8
 equivalent axial compression, 62-2
 equivalent beam, 51-5
 Espey, 20-12
 European, distance measurement, 78-8
 extraction, 76-9
 false position, 12-2 (ftn)
 first-in, first-out, 87-38
 fixed-base, 20-7
 fixed percentage on diminishing
 balance, 87-21 (ftn)
 fixed percentage on diminishing
 value, 87-21 (ftn)
 Greenshields-Poisson, 73-17
 Hardy Cross, 17-24
 Hveem mix design, 76-14
 instantaneous center of rotation, 65-5
 integration, 42-1, 42-4
 isohyetal, 20-2
 lagging storm, 20-13
 last-in, first-out, 87-38
 least squares, 78-15
 LFR, 74-3
 loss, 24-17
 Marshall, 76-10
 Marshall test, 76-11
 mechanistic-empirical, 76-16
 Newton's, 12-2
 nonsequential drought, 20-20
 normal-ratio, 20-3
 numerical, 12-1

numerical, polynomial, 3-4
 of consistent deformations, 44-19, 47-7
 of coordinates, 78-16
 of discs, 9-6
 of equivalent lengths, 17-12
 of joints, 41-14
 of least squares, 11-16
 of loss coefficients, 17-12
 of sections, 41-15
 of shells, 9-6
 of undetermined coefficients, 3-6, 10-4
 oxidation number change, 22-8
 parallelogram, 5-3
 peak searching, 75-17
 polygon, 5-3
 present worth, 87-15
 prism test, 67-4
 projection, 87-10
 pyramid, 76-14
 radial displacement, 78-19 (fig)
 rate of return, 87-17
 rational, modified, 20-20
 rational, peak runoff, 20-14
 regula falsi, 12-2 (ftn)
 S-curve, 20-13
 secant, 12-2 (ftn)
 simple ranking, 75-17
 sinking fund, 87-22
 sliding window, 75-17
 solid volume, concrete, 77-2
 specific identification, 87-37
 stadia, 78-8, G-13
 station offset, 79-5
 storage indication, 20-21
 straight-line, 20-7, 87-21
 strength design, 50-3
 sum-of-the-years', 87-21
 superposition, 46-4
 surface area, 76-6
 surveying, 78-5
 tangent offset, 79-5
 Thiessen, 20-2
 transfer unit, 34-22
 ultimate strength design, 45-2
 unified, 50-3
 unit strength, 67-3
 variable-slope, 20-8
 Winfrey, 87-16 (ftn)
 Methyl
 alcohol, 24-7
 orange alkalinity, 22-21
 Methylmercury, G-9
 Metolachlor, 32-12
 Metric
 system, 1-4
 ton, 1-7
 Meyer
 hardness, 43-13
 test, 43-13
 -Vickers test, 43-13
 Meyerhof bearing capacity
 factor, 36-3, 36-4 (tbl)
 mg/L, 22-11
 mho, 84-2 (ftn)
 Mica, 35-32
 Microbe, 27-4
 categorization, 27-4
 characteristic, 27-7 (tbl)
 growth, 28-6
 organism, 27-7 (tbl)
 Micrometer, 32-8 (ftn)
 Micron, 32-8 (ftn)
 Micronized coal, 24-5 (ftn)
 Microorganism, 27-4, G-9
 Micropile (*see also type*), 38-6
 machine-drilled, 38-6
 Microsilica, 48-2
 Microstrain, 85-9
 Microstrainer, 26-3, 26-15
 Microtunneling, 40-11
 Microwave asphalt recycling, 76-28

Middle
 ordinate, 79-11
 strip, slab, 51-6
 Midspan deflections from
 prestressing, 56-5 (fig)
 Migration
 leachate, 31-7
 velocity, 34-9
 Mil, 22-19, A-3, A-4
 Mile, nautical, 79-21
 Miles per gallon, 75-3, 75-4, 75-11
 Milk of lime, 26-15
 Milliequivalent per liter, bar chart, 25-1
 Milligram
 equivalent weight, 22-11
 per liter, 22-11, 22-24 (ftn)
 Million, parts per, 22-11
 Mineral
 aggregate, 76-3
 detrital, G-5
 filler, 76-3
 matter, 24-3
 Minima point, 8-2
 Minimum
 attractive rate of return, 87-14, 87-16
 beam thickness, 50-17 (tbl)
 beam width, 50-8 (tbl)
 column eccentricity, 69-3
 design speed, 73-4 (tbl)
 fillet weld size, 66-3 (tbl)
 point, 8-2
 radius curve, 79-8
 shear, 46-10
 splice length, 67-7
 thickness, asphalt, 76-24 (tbl)
 thickness, slab, 51-2 (tbl)
 velocity, open channel, 19-2
 weld size, 66-9
 Minipile, 38-6
 Minor
 axis, 7-11, 59-2, 61-4
 axis buckling and bracing, 61-4 (fig)
 entrance loss coefficient, 19-28 (tbl)
 loss, 17-12, A-57
 of entry, 4-2
 plant, 28-3
 Minus
 declination, 78-12
 sight, 78-10
 Mirex, 32-12
 Miscellaneous formulas, angles, 6-4
 Misrepresentation, 88-6
 Missing
 angle, traverse, 78-16
 side, traverse, 78-16
 Mission time, 11-9
 Mitochondria, 27-2
 Mix
 asphalt, 76-3
 bituminous, 76-2
 dense-graded, 76-3
 design, Hveem method, 76-14
 design, Marshall method, 76-10
 design method, hot mix asphalt
 concrete, 76-10
 flow value, 76-11
 open-graded, 76-3
 plant, 76-6, G-11
 road, G-12
 six-sack, 49-2
 stability, 76-11
 tender, 76-5
 Mixed
 bed unit, naked, 22-24
 -flow pump, 18-4 (ftn)
 -flow reaction turbine, 18-23
 liquor, 30-2
 liquor suspended solids, 30-4
 liquor volatile suspended solids, 30-4
 occupancy, 82-7
 triple product, 5-4, 5-5
 use, 82-7

- Mixer, 26-10
 asphalt, 76-6
 batch, 76-6
 center-entry, 76-6
 counterflow, 76-6
 drum, 76-6
 flash, 26-10
 paddle, 26-10
 parallel-flow, 76-6
 quick, 26-10
 rapid, 26-10
- Mixing
 complete, 26-10, G-4
 concrete, 49-2, 49-5
 model, complete, 26-10
 model, plug flow, 26-10
 opportunity parameter, 26-11
 plug flow, 26-10
 problem, 10-8
 rate constant, 26-10
 Reynolds number, 26-11
 velocity, 26-11
 water, concrete, 77-3, 77-4
 water requirement, concrete, 77-3 (tbl)
- Mixture, G-9
 air-entraining, 48-3
 asphalt, 76-4
 concrete (*see also type*), 49-1
 concrete, typical, 48-1
 gap-graded, 76-3
 proportioning, concrete, 77-2
 rule, 32-2
 sweetening, 48-2
 watery, 48-4
 wet, 48-4
- mks system, 1-4, 1-5
 MLSS, 30-4
 MLVSS, 30-4
 ML θ T system, 1-7
 MMA concrete, 48-7
- Mobile batcher mixer, 49-5
- Mode, 11-12
 alternate, 73-19
 brittle failure, 50-6
 ductile failure, 50-6
 free-flow, 19-14
 rapid static, 78-6
 speed, 73-4
 submerged, 19-14
- Model, 17-45
 Bingham-plastic, 17-12
 Calvert, venturi scrubber, 34-18
 code, 82-1
 distorted, 17-45
 filter drag, 34-5
 live load, 74-3
 M/M/1 single-server, 73-28
 M/M/s multi-server, 73-29
 power-law, 17-12
 queuing, 73-27
 scale, 17-45
- Modeling
 pedestrian impact, 75-15
 stormwater, 20-23
 vehicle accident, 75-13
 watershed, 20-23
- Modification factor, crash, 75-16
- Modified
 Accelerated Cost Recovery System, 87-22
 Angoff procedure, xxxi
 Davis equation, 75-5
 portland cement, 48-1
 Proctor test, 35-18
 rational method, 20-20
- Modifier, asphalt, 76-5, 76-6 (tbl)
- Modular ratio, 44-20, 50-15, 56-3, 56-4, 57-3
- Modulus, 3-7, 3-8
 apparent, 43-11
 bulk, 14-14
 bulk, water, 14-14
 chord, masonry, 67-4
 creep, plastics, 43-11
 elastic, 43-2
 elasticity, shear, 43-8
 fineness, 48-2
 initial, 48-5
 of elasticity, 43-2, 43-4, 44-2, 58-2
 of elasticity, concrete, 48-5 (fig), 77-6
 of elasticity, grout, 67-6
 of elasticity, reduction at high temperature, steel, 43-3 (tbl)
 of elasticity, representative material at room temperature, 43-2 (tbl)
 of elasticity, secant concrete, 48-5
 of elasticity, steel, 17-39, 48-10
 of resilience, 43-7
 of rigidity, 43-8
 of rupture, 50-16, 77-6
 of rupture, concrete, 48-6
 of shear, 43-8
 of subgrade reaction, 35-31, 76-20
 of subgrade reaction, Westergaard, 77-5
 of toughness, 43-7
 plastic section, 59-8
 point bulk, 14-14
 resilient, 76-20, G-12
 secant, 43-4
 secant, bulk, 14-14
 section, 42-7, 44-11, 59-3
 shear, 43-8 (tbl), 44-2, 58-2
 subgrade, 35-31
 tangent, 48-5
 tangent, bulk, 14-14
 Young's, 43-2, 44-2, 48-5
 Young's, concrete, 48-5
- Mohlman index, G-10
- Mohr-Coulomb equation, 35-26 (ftn)
- Mohr's
 circle, 42-8, 44-7
 circle for stress, 44-7 (fig)
 theory of rupture, 43-8
- Mohs
 hardness scale, 43-13 (fig)
 scale, 43-13
 test, 43-13
- Moisture, 23-1
- Moist
 curing, 48-5
 density, 35-7
- Moisture
 condition, antecedent, 20-17 (ftn)
 content, 35-7
 content, optimum, 35-18, 35-20
 content, soil, 21-2
 level, bed, 24-3
- mol, 22-5
- Molality, 22-11
- Molar
 specific heat, 13-4
 volume, 22-5
- Molarity, 22-11
- Mole, 22-4, G-10
 fraction, 14-6, 22-11, 24-2
 percent, 14-6
- Molecular
 formula, biomass, 27-11
 weight, 22-5, G-10
- Molecule, 22-2
 hydrated, 22-5
 spacing, 14-2
- Mollier diagram, steam, A-87
- Mollusk, 27-8
- Moment, 41-2, 44-8
 amplification factor, 53-5, 62-1
 area method, 44-14
 arm, 41-3
 available, table, 59-10
 available, versus unbraced length, 59-3 (fig)
 bending, 44-8 (ftn), 44-11
 capacity, 50-9
 coefficient, 47-18
 component, 41-3
 couple, 41-4
 coupling, 41-4
 cracking, 50-15, 56-10
 critical section, 55-4 (fig)
 diagram, 44-8, 59-14
 distributed load, 41-6
 distribution, column strip, 51-7 (tbl)
 distribution, exterior span, 51-7 (tbl)
 distribution method, 47-2, 47-3, 47-13
 distribution worksheet, A-133
 elastic fixed-end, A-126, A-127
 end, amplified, 53-5
 factored, slab beam, 51-6
 first area, 42-2
 fixed-end, 46-7
 flexural, 44-8 (ftn)
 footing, overturning, 36-9 (fig)
 force about a line, 41-3 (fig)
 fourth standardized, 11-14
 free, 41-4, 41-9 (fig)
 function, 44-14
 gradient multiplier, 59-4
 hydrostatic, 15-11
 magnification, 53-1
 magnifier, 53-5
 maximum, 44-9
 maximum plastic, 59-13 (tbl)
 modification factor, 59-4
 of a function, first, 9-6
 of a function, second, 9-6
 of area, first, 46-5
 of force about a point, 41-3
 of inertia, 42-3, A-114
 of inertia, area, 42-3, A-114
 of inertia, cracked, 50-15 (fig), 53-3
 of inertia, effective, 50-16
 of inertia, gross, 50-16
 of inertia, mass, 70-2
 of inertia, polar, 42-6
 of inertia, principal, 42-8
 of inertia, transformed, 50-15
 of momentum, 72-3
 one-way, 44-8 (ftn)
 overturning, dam, 15-12
 resisting, 44-8 (ftn)
 -resisting connection, 65-7
 -resisting connection, framing, 65-8 (fig)
 righting, 15-18
 second area, 42-4
 statical, 42-3, 44-10
 strength, nominal, 50-8
 ultimate plastic, 59-12
- Momentum, 17-33, 72-2
 angular, 17-33, 72-3 (fig)
 conservation, 72-2
 fluid, 17-33
 flux, 17-14 (ftn)
 law of conservation, 72-2
 linear, 17-33, 72-2
 moment of, 72-3
- Money, time value, 87-5
- Monitor
 steel, 45-21
 well, 21-4
- Monitoring
 landfill, 31-9
 project, 86-15
 well, 31-9
- Monod's equation, 28-6
- Monofill sludge, 30-20
- Monomial, 3-3
- Monomictic, G-10
- Monte Carlo simulation, 20-22, 87-42 (ftn)
- Montreal Protocol, 32-5
- Moody friction factor chart, 17-6, 17-7 (fig)
- Mortality, infant, 11-9
- Mortar, 67-5
 face shell, 68-4
 full, 68-4
 masonry, 68-3
 properties, 67-5

- Most
 economical shape, 58-6
 efficient cross section, 19-9
 likely value, 78-2
 probable number index (MPN), 27-9
- Motion
 about fixed point, 72-2
 angular, 71-7
 circular, 71-7
 constrained, 72-11 (fig)
 dependent, 71-12
 general, 72-2
 general plane, 72-2
 impending, 72-5
 impending phase, 72-6
 laws of planetary, 72-20
 linear, 71-2
 Newton's first law of, 26-5, 72-4
 Newton's second law of, 72-4
 Newton's third law of, 72-5
 plane, 71-12
 plane of, 72-2
 planetary, 72-20 (fig)
 projectile, 71-4
 relative, 71-10
 rigid body, 72-2
 rotational particle, 71-7
 unconstrained, 72-11 (fig)
 uniform, 71-3
- Motor, 84-12, 84-15, A-174
 electrical, 84-12
 gear, 18-11
 induction, 84-14
 octane number, 24-6
 polyphase, A-173
 service factor, 18-10
 size, 18-10
 speed control, 84-15
 synchronous, 84-15
- Mountain survey, 78-5
- Movable equipment cost, 86-5
- Movement
 critical, 73-15
 in depth, 75-9
 nonweaving, 73-26
 weaving, 73-26
- Moving
 average forecasting, 87-42
 load, 46-14
- MSDS category, 83-4, 83-5
 chemical identity, 83-4, 83-5
 control measure, 83-5, 83-6
 fire and explosion hazard data, 83-4, 83-6
 hazardous ingredient/identity information, 83-4, 83-5
 health hazard data, 83-5, 83-6
 manufacturer's name, 83-4, 83-5
 physical/chemical characteristic, 83-4, 83-6
 reactivity data, 83-4, 83-6
 safe handling and use precaution, 83-5, 83-6
 special precaution, 83-5, 83-6
- MSW, 31-1
- MTBF, 11-9 (ftn)
- MTON, 1-7
- MTTF, 11-9
- Mud line, 39-2, G-10
- Mulching, 80-11
- Multi
 -dial controller, 73-19
 -layer filter, 26-13
 -media filter, 26-13
- Multilane highway, 73-10
- Multiloop pipe system, 17-24
- Multiplate, 16-11
- Multiple
 hypergeometric distribution, 11-5
 pipe containment, 34-16
- reservoir, 17-22
 -stage pump, 18-4
 wythe, 68-14
- Multiplication
 matrix, 4-4
 vector, 5-3
- Multiplicity of rates of return, 87-12 (tbl)
- Multiplier
 asymmetric, 83-7, 83-8
 bearing capacity factor, 36-4 (tbl)
 coupling, 83-7, 83-8
 distance, 83-7, 83-8
 frequency, 83-7, 83-8
 horizontal, 83-7, 83-8
 moment gradient, 59-4
 vertical, 83-7, 83-8
- Municipal
 solid waste, 31-1, 31-2, 31-10
 solid waste landfill, 31-2
 wastewater, 28-2
 water demand, 26-22
- Mushroom cap, 83-7
- Mussel, 27-8
 zebra, 27-8
- N**
- N-value, 35-16, 36-7
 correlation, 35-17
- NAAQS, 32-2
- Nadir, 78-19
- Nailing, soil, 40-10
- Naked mixed bed unit, 22-24
- Name
 IUC, 23-1
 IUPAC, 23-1
- Nameplate
 motor, 84-13
 rating, 18-10
- Names and formulas, chemicals, A-88
- Nanofiltration, 26-22
- Naphthalene series, 24-1
- Napierian logarithm, 3-5
- Nappe, 19-11
- National
 ambient air quality standards (NAAQS), 32-2
 Board of Fire Underwriters equation, 26-24
 Bridge Inspection Standards, 74-1 (ftn)
Building Code, 58-5 (ftn)
 Cooperative Highway Research Program, 76-16, 76-22
 Council of Examiners for Engineering and Surveying, 90-1
Electrical Code, 82-2, 84-8
 Fire Protection Association, 82-3
 primary drinking water standards, 25-5, A-96
 Research Council, 29-10
 Society of Professional Engineers, 89-1, 89-3
- Nationally Recognized Testing Laboratory, 82-3
- Natural
 attenuation, landfill, 31-2
 frequency, 9-7
 gas, 24-8, 24-11
 gas, standard condition, 24-2
 logarithm, 3-5
 watercourse, 19-10
- Nautical mile, 79-21
- Navigation sub-task, 75-8
- NBIS, 74-1 (ftn)
- NCHRP, 76-16, 76-22
- NDT, 82-4
- Neat line, 80-10
- NEC, 82-2, 84-8
 continuous operation, 84-8
- Necking down, 43-5
- Needed fire flow, 26-23
 ISO, 26-23
- Needle
 pile, 38-6
 valve, 16-12
- Negative
 declaration, 32-3
 element, 85-7
 exponential distribution, 11-9
 skin friction, 38-6
 temperature coefficient, 85-5
- Negligence, 88-6
 comparative, 88-6
- NEMA motor size, 18-10 (tbl), 84-12
- Nematode, 27-8
- Nephelometric turbidity unit, 25-8
- Nest, piezometer, G-11
- Net
 air-to-cloth ratio, 34-5
 allowable bearing pressure, 36-2
 area, 60-2, 60-3
 area, critical, 60-3
 area, effective, 60-3
 bearing capacity, 36-3
 filtering area, 34-5
 filtering velocity, 34-5
 flow, 20-7, 21-7
 head, 18-6
 heating value, 24-14
 income, 87-34
 inlet pressure required, 18-14 (ftn)
 line, 80-10
 net filtering velocity, 34-5
 positive inlet pressure, 18-2 (ftn)
 positive suction head available, 18-14
 positive suction head required, 18-14
 present value, 87-5 (ftn)
 profit, 87-37
 rain, 20-7 (ftn), 20-17, G-10
 specific growth rate, 28-7
 stack temperature, 24-14
 strains, 85-11
 tensile strain, 50-5 (fig)
- Netting, draining, 31-3
- Network
 activity-on-arc, 86-12
 activity-on-branch, 86-12
 activity-on-node, 86-11
 diagnosis, transportation, 75-17
 node, transportation, 75-15
 pipe, 17-24
 roadway, warrant, signalization, 73-19
 screening, transportation, 75-17
 transportation, 75-2, 75-15
- Neutral
 axis, 44-11
 axis, plastic, 64-3
 equilibrium, 72-2
 plane, 44-11
 pressure, 21-9
 solution, 22-12, 25-1
 stress, 35-14
 stress coefficient, 21-9
- Neutralization, 22-12, 34-23
- Neutralizing amine, 22-23
- Neutron
 gaging, 43-12
 radiography, 43-12
- Newmark chart, 40-2
- Newton, 1-1, 1-5
 form, 12-3 (ftn)
- Newton's
 first law of motion, 26-5, 72-4
 gravitational constant, 72-20 (tbl)
 interpolating polynomial, 12-3
 law of cooling, 10-10
 law of gravitation, 72-20
 law of universal gravitation, 72-20
 law of viscosity, 14-6, 14-7
 method, 12-2
 notation, 8-1
 second law of motion, 72-4
 third law of motion, 72-5
 universal constant, 72-20

- Newtonian
 fluid, 14-2, 14-7
 inertial frame of reference, 71-10
 non-, viscosity, 17-12
- NFPA, 82-2, 82-3
 252, 82-4
 257, 82-4
 5000, 82-1
- Nickel, A-116, A-117, A-118
- Nikuradse equation, 17-5
- NIMBY syndrome, 31-5
- NIOSH lifting equation, 83-7
- Nitrate
 in wastewater, 28-14
 in water, 25-8
 nitrogen, 27-6
- Nitric oxide, 32-9
- Nitrification, 28-9
 /denitrification process, 29-12
- Nitrile, 23-1 (tbl), 23-2 (tbl)
- Nitro, 23-1 (tbl)
- Nitrogen
 dioxide, 32-9
 fixation, G-10
 in wastewater, 28-14
 ion, in water, 25-8
 Kjeldahl, 28-14
 organic, 25-8, 28-14
 oxide, 32-9
 -oxygen ratio, 24-8
 total, 25-8, 28-14
- Nitrogenous demand, 28-9, G-10
- Nitrous oxide, 32-9 (ftn)
- No-boiler incinerator, 31-10
- Noble gas, 22-3
- Node, 7-2, 86-10, G-10
 dummy, 86-13
 transportation network, 75-15
- Noise
 action level, OSHA, 83-8
 dose, 83-8
 dose, permissible, 83-8 (fig)
 exposure level, 83-8 (tbl)
 level limit, 83-8
 OSHA, 83-8
 reduction ratio, 83-8
- Nomenclature
 photogrammetry, 78-18 (fig)
 steel, 58-1
- Nominal
 concrete shear strength, 50-21
 damages, 88-7
 dimension, pipe, 16-10
 interaction diagram, 52-6
 interest rate, 87-28
 moment strength, 50-8
 resistance, 74-4
 shear strength, 50-21
 shear strength, beam, 59-5
 strength, 45-2, 50-5
 system voltage, 84-5 (ftn)
 value, 50-4
- Nomograph, Hazen-Williams, A-57
- Non
 -Newtonian fluid, 14-2
 -Newtonian viscosity, 17-12
 -SI units, 1-7
- Nonattainment area, 32-2
- Nonbearing wall, 54-1
- Noncarbonate
 hardness, 22-21, 25-3, 25-4
 hardness removal, 26-15
- Noncatalytic reduction, selective, 34-19
- Noncircular duct, 17-9
- Nonclog pump, 18-5
- Noncohesive soil, 37-2
- Noncompact section, 61-6
- Noncomposite
 action, 68-14
 load, 57-3
- Nonconcentric tension connection, 66-5
- Noncriteria pollutant, 32-2
- Noncritical activity, 86-11
- Nondestructive
 evaluation, 43-12, 82-4
 inspection, 82-4
 test, 43-14, 82-4
 testing, 43-11, 43-12, 82-4
- Nonhomogeneous
 differential equation, 10-1, 10-3
 linear equation, 3-7
- Nonlinear
 equation, 10-1
 interpolation, 12-2, 12-3
 regression curves, 11-17
 second-order analysis, 53-1
- Nonliquid asset, 87-35
- Nonlubricated condition, 72-6
- Nonmerging taper, 73-32
- Nonmetal, 22-2, 22-3
- Nonparametric equation, 3-3
- Nonpathogenic, G-10
- Nonphotosynthetic bacteria, 27-6
- Nonplastic soil, 35-22
- Nonpoint source, G-10
- Nonpotable water, 27-4
- Nonquantifiable factor, 87-2
- Nonquantitative factor, 87-2
- Nonrectangular channel, 19-18
- Nonreverse-flow check valve, 16-12
- Nonsequential drought method, 20-20
- Nonsingular matrix, 4-5
- Nonstripping sight distance, G-10
- Nonuniform flow, 19-2, 19-15
- Nonvibration concrete, 48-7
- Nonvolatile solids, 30-4
- Nonweaving movement, 73-26
- Nonwoven fabric, 40-10
- Normal
 component, 71-9
 component, acceleration, 71-8
 cubic meter, 24-2
 curve, area under standard, A-12
 depth, 19-6, G-10
 depth, rectangular channel, 19-6
 distribution, 11-6
 force, 72-4 (ftn), 72-6, 75-5
 force, on a dam, 15-12
 form, 7-5
 hydrogen, 22-2
 line vector, 8-6
 portland cement, 48-1
 -ratio method, 20-3
 slope, 19-3
 speed, 72-8
 stress, 44-2
 temperature and pressure, 24-3
 vector, 7-6
 view, 2-1
- Normality, 22-11
- Normalized eccentricity, 52-3
- Normally consolidated, 35-24
 clay, 40-3
 curve, 40-4
 soil, 40-4, G-10
- Normalweight concrete, 48-4, 48-6, 48-7
- North American Industry Classification
 System, 83-2 (ftn)
- Norwalk virus, 27-6
- Notation, Newton's, 8-1
- Notch
 -brittle material, 43-6 (ftn)
 factor, fatigue, 43-10
 sensitivity, 43-10
 stress concentration, 44-5
 toughness, 43-14, 43-15
- NOx, 32-9
 burner, low, 34-15
 burner, ultra-low, 34-15
 control, 24-5
 fuel, 32-9
 fuel-bound, 32-9
 prompt-, 32-9
- Nozzle
 ASME long radius, 17-32 (ftn)
 coefficient, 18-22
 converging-diverging, 17-29
 flow, 17-32
 ISA, 17-32 (ftn)
 loss, turbine, 18-22
- NPDES, 29-1, 32-14, G-10
- NPSE, 89-1
- NPSHA, 18-14
- NPSHR hydrocarbon, 18-21
- NRC equation, 29-10
- NRCS, 20-3, 20-11
 curve number, 20-16
 dimensionless unit hydrograph, 20-11
 graphical method, 20-17
 lag equation, 20-4
 peak discharge, 20-17
 synthetic unit hydrograph, 20-11, 20-12
- NRTL, 82-3
- NTU, 25-8, G-10
- Nuclear
 gauge, 35-21, 76-9
 moisture/density gauge, 35-21
 sensing, 43-12
- Nucleon, 22-2
- Nuisance flood, 20-6
- Null
 event, 11-3
 hypothesis, 11-15, 75-12
 -indicating bridge, 85-9 (ftn)
 indicator, 85-9
 matrix, 4-1
 point, 34-10
 position, 85-4
 region, 7-3
 set, 11-1
- Number
 atomic, 22-2, A-83, G-2
 Avogadro's, 22-5
 Brinell hardness, 43-13
 cavitation, 18-16
 cetane, 24-7
 charge, 22-4
 complex, 3-1, 3-7
 curve, NRCS, 20-16
 curve, SCS, 20-16
 dimensionless, 1-9 (tbl)
 direction, 7-5
 Eötvös, 1-9 (tbl), 17-45
 Froude, 17-47, 19-18
 imaginary, 3-1
 irrational, 3-1
 Mach, 14-15
 motor octane, 24-6
 octane, 24-6
 odor, G-10
 odor threshold, 26-15
 of passes, effective, 29-10
 of transfer units, 34-19
 oxidation, 22-3 (tbl), 22-4, G-10
 performance, 24-6
 period, 87-9
 random, A-82
 rational, 3-1
 real, 3-1
 research octane, 24-6
 Reynolds, 16-7
 Reynolds, similarity, 17-46
 smoke spot, 24-12, 32-15
 stability, 39-2, 40-7
 structural, 76-17
 threshold odor, 26-15
 type, 3-1
 viscosity blending, 14-16
 Weber, 17-47 (ftn)
 Weber, similarity, 17-47 (tbl)
- Numbering system, 3-1
- Numerical
 analysis, 12-1

- event, 11-4
 - method, 12-1
 - method, polynomial, 3-4
- Nusselt number, 1-9 (tbl)
- Nut
 - coal, 24-4
 - factor, 45-13
 - material, 58-4
- O
- O'Connor and Dobbins formula, 28-7
- Object height, 78-19
- Objective safety, 75-2
- Objectively scored problem, 90-3
- Obligate
 - aerobe, 27-6
 - anaerobe, 27-6
- Oblique
 - axis, 2-2
 - impact, 72-18
 - perspective, 2-3
 - triangle, 6-5
 - triangle equations, A-172
 - view, 2-2
- Observation well, G-10
- Observed yield, 30-8
- Obsidian, 35-32
- Obstruction meter, 17-26
- Obtuse angle, 6-1
- Occupancy
 - category, 82-6
 - class, 82-6
 - combustible factor, 26-23
 - group, 82-6, 82-7 (tbl)
 - mixed, 82-7
 - ratio, lane, G-9
- Occupational
 - illness, 83-2
 - injury, 83-2
 - Safety and Health Administration, 83-1
- Occurrence, frequency of, 20-5
- Ocean, dumping, sludge, 30-20
- Octagon, properties, A-7, A-8
- Octane number, 24-6
- Odd symmetry, 7-4, 9-7 (tbl)
- Odor, 32-11
 - control, 29-3
 - in water, 26-15
 - number, G-10
 - number, threshold, 26-15
 - sewage, 29-3
- Oedometer test, 35-24, 40-5
- Off-gas, 34-21
- Offer, 88-3
- Official benchmark, 78-7
- Offset, 73-19, 75-13
 - chord, 79-5 (fig)
 - chord, method, 79-6
 - horizontal sightline, 79-11
 - parallel, 43-3
 - stake, 81-1, 81-3
 - stake, measurement, 81-3
 - station, 79-5
 - tangent, 79-5 (fig)
 - tangent, spiral, 79-18
- Offshoring, 89-4
- Ogee, 19-13
 - spillway, 19-13 (ftn)
- Ohm's law, 84-3, 84-6
- Oil
 - Bunker C, 24-6
 - distillate, 24-6
 - fuel, 24-6
 - residual fuel, 24-6
 - spill, 32-11
- Oily condition, 72-6
- Olefin series, 24-1
- Oligotrophic, G-10
- On cost, 86-9
- On-demand timing, 73-20
- Once-through cooling water, 32-6
- One
 - sided major weave, 73-26
 - sided ramp weave, 73-26
 - sided weaving
 - segment, 73-26, 73-27 (fig)
 - tail confidence limit, 11-15
 - third load increase, 68-3
 - third rule, 78-17
 - way drainage, 40-5
 - way moment, 44-8 (ftn)
 - way shear, 44-8 (ftn), 55-3
 - way slab, 51-2
 - way, slab, 51-2 (fig)
 - percent flood, 20-6, 20-7
- Ontario barrier, 75-13 (fig)
- Opacity smoke, 32-15
- Open
 - area, well screen, 21-4
 - channel, 19-2
 - channel flow, 16-5
 - channel, conveyance
 - factor, A-77, A-78, A-79, A-80
 - channel, flow, type, 19-2
 - channel, hydraulic parameter, 19-3
 - circuit, electrical, 84-2
 - cut method, 40-11
 - graded aggregate, 76-3
 - graded friction course, 76-3
 - graded mix, 76-3
 - grid floor, 57-4
 - loop recovery system, 34-4
 - manometer, 15-3
 - traverse, 78-13
- Opening, sieve, 35-2
- Operating
 - and maintenance cost, 87-32
 - cost, 86-9
 - expense, 87-32
 - load, 74-3
 - point, extreme, 18-18
 - point, pump, 18-17
 - rating level, bridge, 74-3
 - speed, 73-3
 - supply, 87-33
- Operation
 - alternate mode, 73-19
 - complex number, 3-8
 - double-alternate mode, 73-19
 - inverse trigonometric, 6-4
 - steady-state, 11-9
- Operational form, log, 3-5
- Operations, balancing, 70-2
- Operator's cab, 83-10
- Opportunity cost, 87-18
- Opposite side, angle, 6-2
- Optical
 - density, 32-15
 - holography, 43-13
 - plummet, 78-9
- Optimum
 - asphalt content, 76-11
 - density, 73-6
 - moisture content, 35-20
 - speed, 73-6
 - water content, 35-18
- Orbit
 - eccentricity, 72-21 (tbl)
 - geostationary, 72-20
 - law of, 72-20
- Order, G-10
 - change, 86-16
 - conscious, 11-2
 - differential equation, 10-1
 - first, survey accuracy, 78-4
 - matrix, 4-1
 - of accuracy, 78-4
 - of the reaction, 22-13
 - stream, G-13
 - survey accuracy, 78-4
- Ordinance, zoning, 82-2
- Ordinate, 7-2
 - middle, 79-11
- Organelle, 27-1
- Organic
 - acid, 23-2 (tbl)
 - chemical, volatile, G-15
 - chemistry, 23-1
 - chlorinated, 32-12
 - color, in water, 25-8
 - compound, 23-1
 - compound family, 23-1
 - compound, synthesis route, 23-3
 - compound, volatile, 28-14, 32-16
 - family, 23-2, 23-3
 - functional group, 23-1, 23-3
 - loading, 28-3, 29-10
 - matter, 35-4
 - nitrogen, 25-8, 28-14
 - polymer, 26-8
 - precursor, 25-9, 25-10
 - refractory, 28-6
 - sedimentary rock, 35-32
 - solid, dissolved, 29-3
 - sulfur, 24-3
 - trace, 29-3
- Organism
 - indicator, 27-8
 - microbe, 27-7 (tbl)
- Organismal growth, 27-3
- Organochlorine pesticide, 32-12
- Organophosphate, 32-12
- Organotroph, 27-4
- Orientation, angular, 5-1
- Orifice, 17-16
 - coefficients, 17-17 (tbl)
 - double, air valve, 16-14
 - large, 17-18
 - meter, 17-30 (fig)
 - plate, 17-30
- Orsat apparatus, 24-12
- Orthogonal, 7-2
 - vector, 5-3
 - view, 2-1
- Orthographic
 - oblique view, 2-3
 - view, 2-1, 2-2
- Orthophosphate, 25-7
- Orthotropic, G-10
- Orthotropic, 57-4 (ftn)
 - bridge deck, G-10
 - material, G-10
 - steel deck, 57-4
- OSHA, 35-33, 83-1
 - 1910, general industry, 83-1 (tbl)
 - 1926, construction industry, 83-2 (tbl)
 - action level, 83-8
 - Form 300, 83-2 (ftn)
 - injury incidence rate, 83-2
 - noise limit, 83-8
 - recordable incident, 83-2
 - scaffold regulation, 83-9
 - severity rate, 83-2
- Osmosis, 14-10, G-10
 - reverse, 26-22
- Osmotic pressure, 14-10
 - apparatus, 14-10
- Othmer correlation, 14-11
- Outcrop, G-10
- Outfall, G-10
- Outlet control, 19-27
- Outrigger, 83-9, 83-10
- Over-reinforced beam, 50-6
- Overall
 - coefficient of heat transfer, 30-17
 - efficiency, pump, 18-9
 - stability constant, 22-15
- Overallocation, 86-10
- Overautogenous waste, 34-11 (ftn)
- Overburden, 36-3
 - correction, 36-8
 - stress, 35-15
- Overchute, G-10
- Overconsolidated
 - clay, 40-3, 40-4 (fig)

- curve, 40-4
 - segment, 40-4
 - soil, 35-24, 40-4
 - Overconsolidation ratio, 35-25
 - Overcurrent protection device, 84-8
 - Overdraft, 21-6
 - Overdrive gear, 75-3
 - Overflow
 - rate, 26-6, 29-7
 - spillway, 19-13
 - Overhaul, 80-8, G-10
 - Overhead, 87-36
 - cost, 86-6
 - general, 86-6
 - general plant, 87-33
 - project, 86-6
 - variance, 87-36
 - Overhung load, 18-11
 - Overland flow, 20-7 (ftn), G-10
 - velocity, 20-4
 - Overlay thin, 77-13
 - Overload
 - driver, 75-9
 - factor, 45-2
 - point, 18-16
 - Oversail, 83-9 (ftn), 83-10 (ftn)
 - Oversized hole, 65-1
 - Overturn, G-10
 - Overturning
 - factor of safety, 15-12
 - moment, dam, 15-12
 - moment, footing, 36-9 (fig)
 - Owner, 88-4
 - Owners' equity, 87-33
 - Ownership, 88-1
 - Oxidant, 26-9, 32-11
 - total residual, 29-13
 - Oxidation, 22-7, 23-2, G-10
 - reduction reaction, 22-7
 - advanced, 34-4
 - ditch, 30-3
 - industrial wastewater
 - pollutant, 34-17 (tbl)
 - number, 22-3, 22-4, G-10
 - number change method, 22-8
 - pond, 29-4
 - power, common oxidant, 34-5 (tbl)
 - process, advanced, 26-21
 - state, 22-3
 - tower, 29-9
 - Oxide
 - nitrogen, 32-9
 - sulfur, 32-15
 - Oxidizing agent, 22-7
 - Oxyacid, 22-4
 - Oxygen
 - enriched incineration, 34-14
 - deficit, 28-7
 - deficit, critical, 28-11
 - demand, 30-9
 - demand, biochemical, 27-9, 28-8, G-3
 - demand, chemical, 28-12
 - dissolved, 28-7
 - in water, dissolved, A-87
 - point, 85-6 (ftn)
 - sag (Streeter-Phelps), 28-10
 - sag curve, 28-11 (fig)
 - sag curve, dissolved, 28-10
 - saturation coefficient, 30-9
 - scavenging, 22-23
 - transfer, rate of, 30-9
 - Oxygenate, 24-7
 - common type, 24-7 (tbl)
 - Oxygenated
 - fuel, 32-5
 - gasoline, 24-6, 24-7
 - Oxygenation, 28-10
 - rate constant, 28-9
 - Ozonation, 26-21, 34-17
 - Ozone, 26-21
 - atmospheric, 32-5
 - depletion, 32-5
 - pollutant, 32-11
- P**
- p*
 - chart, 11-16
 - sequence, 3-11
 - series, 3-12
 - V work, 13-3, 13-4
 - P*
 - delta analysis, 47-16
 - delta effect, 53-1, 62-1
 - system, 47-3
 - PAC, 29-13
 - Pace, 73-4
 - group, 73-4
 - interval, 73-4
 - range, 73-4
 - Packed
 - bed spray tower, 34-3 (fig)
 - tower, 34-3, 34-20
 - Packing
 - height of, 34-22
 - media, 34-20
 - media, type, 34-21 (fig)
 - Pad, 36-9
 - Paddle
 - mixer, 26-10
 - velocity, relative, 26-11
 - Paint pipe, 16-11
 - Pan, G-10
 - coefficient, 20-22
 - evaporation, 20-22
 - Panel, 41-12
 - drop, 51-5
 - shear, 46-12
 - truss, 41-12
 - Panhandle formula, 17-10
 - Pappus
 - Guldinus theorems, 42-3
 - Pappus' theorem, 9-5
 - Parabola, 7-10 (fig)
 - formula, A-7
 - Parabolic
 - axis, 7-10
 - cable, 41-17 (fig)
 - column formula, 45-4
 - curve, 79-5, 79-12
 - flare, 79-5
 - taper, 79-5
 - Paraboloid of revolution, A-9
 - Paradox
 - D'Alembert's, 17-2 (ftn)
 - hydrostatic, 15-4
 - Paraffin series, 24-1
 - Parallax
 - absolute, 78-20
 - differential, 78-20
 - height measurement, 78-20 (fig)
 - Parallel
 - axis theorem, 42-4, 70-2
 - circuit, electrical, 84-4
 - flow mixer, 76-6
 - force system, 41-6
 - line, 7-8
 - offset, 43-3
 - parking, 73-22
 - perspective, 2-3
 - pipe, 17-21
 - pump, 18-18
 - reliability, 11-9
 - spring, 45-20, 45-21
 - system, 11-9
 - Parallelogram
 - formula, A-7, A-8
 - method, 5-3
 - Parameter
 - catenary, 41-19
 - impaction, 34-19
 - location, 11-8
 - method, 86-6
 - mixing opportunity, 26-11
 - scale, 11-8
 - sludge, 30-4
 - speed, 73-3
 - value, log-normal distribution, 11-8
 - volume, traffic, 73-4
- Parameters
- consolidation, 40-5 (fig)
 - variation of, 10-4
- Parametric
- equation, 3-2
 - equation, derivative, 8-3
 - equation, plane, 7-6
- Parasite, aquatic, 27-8
- Parcels, 73-25
- Parking, 73-21
 - accessible (disabled), 73-23
 - ADA accessible, 73-23
 - angle, 73-22
 - diagonal, 73-22
 - double-alternate, 73-22
 - lot, 73-22
 - lot, dimensions, 73-23
 - lot, layout, 73-23 (fig)
 - parallel, 73-22
 - stall, 73-22
 - tandem, 73-22
- Parkway, G-10
- Parshall flume, 19-14
 - K-values, 19-14 (tbl)
- Part of line, 83-10
- Partial
 - cloverleaf interchange, 73-25
 - composite action, 64-3
 - differentiation, 8-4
 - emission, forced vortex pump, 18-13 (ftn)
 - fraction, 3-6, 9-3
 - penetration groove weld, 66-2, 66-9
 - pressure, 31-6
 - pressure fraction, 24-2
 - pressure ratio, 24-2
 - prestressing, 56-3
 - similarity, 17-47
 - traverse, 78-16 (fig)
 - treatment, G-10
- Partially
 - compensated foundation, 36-10
 - filled circular pipes, A-30, A-75
 - filled metal deck, 57-4
 - grouted masonry, 68-6
 - incinerated compound, 34-14
 - restrained connection, 65-7
- Particle
 - capture, 32-7
 - conditioning, 34-9
 - exposure time, 34-8, 34-9
 - residence time, 34-8, 34-9
 - resistivity, 34-9
 - size distribution, 35-2
 - size distribution chart, 35-3
- Particles, 71-1
- Particular solution, 10-3, 10-4 (tbl)
- Particulate
 - matter, 32-12
 - phosphorus, 25-7
- Partition coefficient, 27-2, G-10
- Partner
 - general, 88-1
 - limited, 88-2
- Partnering, 86-1
- Partnership, 88-1
 - limited, 88-2
 - limited liability, 88-2
- Parts
 - integration by, 9-2
 - per billion, 22-11
 - per million, 22-11, 22-24 (ftn)
- Pascal's
 - law, 15-4
 - triangle, 3-3

- Passenger
 car equivalent, 73-7 (tbl)
 car equivalent, flow rate, 15 min, 73-10
 Passes, number of, effective, 29-10
 Passing sight distance, 75-6, 79-10, G-11
 Passive
 collection, gas, 31-6
 diffusion, 27-2
 earth pressure, 37-2, 37-4
 earth pressure coefficient, 37-4
 pressure, G-11
 Path critical, 86-9
 Pathogen, 27-4
 Pathogenic, G-11
 Pathway, G-11
 Pattern, bond, 67-3
 Pavement, 76-3
 asphalt concrete, 76-2
 asphalt, recycled, 76-3
 deep strength asphalt, 76-2
 defect, 76-5
 design, methodology, 77-7
 design, rigid, 77-5
 drainage, 77-6
 dual-layer, 77-13
 flexible, 76-10, 76-29, G-6
 flexible, AASHTO
 nomograph, 76-23 (fig)
 full-depth asphalt, 76-2, 76-25
 grade, 79-17, 79-18
 grooving, 77-12
 joint, 77-11
 joint, concrete, 77-11 (fig)
 minimum thickness, 76-22, 76-25
 PCC, tie bar spacing, 77-10 (fig)
 portland cement concrete, 77-1
 problem, 76-5
 recycled, 76-28
 recycled asphalt, 76-6
 recycling, PCC, 77-12
 rigid, 77-1, G-12
 rigid, AASHTO nomograph, 77-8 (fig)
 structural design, flexible, 76-15
 structural number, 76-22
 Paving
 equipment, placement, 76-7
 machine, 76-7
 temperature, 76-7
 Pay
 as you throw, G-11
 -back period, 87-38, 87-39 (ftn)
 Payment, balloon, 87-42
 PCB, 32-12
 PCC, 48-1
 pavement, tie bar spacing, 77-10 (fig)
 PD pump, 18-2
 PDO accident, 75-11
 Pea coal screening, 24-4
 Peak
 demand multiplier, 84-7
 -discharge compartment, 32-14
 discharge, NRCS method, 20-17
 discharge, SCS method, 20-17
 flame temperature, 32-10
 flow direction, 73-5
 hour factor, 73-5
 hour warrant, signalization, 73-18
 pedestrian flow rate, 73-21
 runoff, 20-11
 runoff, rational method, 20-14
 searching method, 75-17
 time to, 20-11
 Peaking factor, 28-2
 wastewater, 28-2
 Harmon's, 28-2
 Pearson's
 kurtosis, 11-14
 skewness, 11-14
 Pedestal, 52-1 (ftn)
 Pedestrian, 73-21
 capacity, 73-21
 circulation area, 73-18
 crash factor, 75-10
 density, 73-21
 impact, 75-15
 impact modeling, 75-15
 LOS, walkway, sidewalk, 73-21 (tbl)
 space, 73-21
 speed, 73-21
 unit flow rate, 73-21
 volume warrant, signalization, 73-18
 Pedology, G-11
 PEL, 83-8
 Peltier effect, 85-7 (ftn)
 Pelton wheel, 18-21
 Pendulum, 72-3
 ballistic, 72-3 (fig)
 Penetrating
 sealer, 77-12
 well, 80-11
 Penetration, 34-9, 34-19
 grading, 76-2
 resistance, 35-16
 test, standard, 35-16, 36-7
 test, thumb, 83-3
 treatment, G-11
 Penetrometer
 pocket, test, 83-3
 test, cone, 35-18
 Penstock, 18-24
 Pentagon, properties, A-7, A-8
 Per
 capita, daily demand, 26-22, 26-23
 diem fee, 88-5
 Percent
 elongation, 43-6
 elongation at failure, 43-6
 mole, 14-6
 of free-flow speed, 73-12
 pore space, 35-8
 sodium content, 25-11
 time spent following, 73-12
 VMA, 76-9
 Percentage
 composition, 22-6
 of construction cost, fee, 88-5
 yield, 22-9
 Percentile, 11-12
 rank, 11-12
 speed, 73-3
 Perception-reaction time, 79-10
 Perceptual cue, 75-9
 Perched spring, G-11
 Percolation, G-11
 field, 29-2
 Perfect reaction, 22-8
 Perfecting a lien, 88-5
 Perforated cover plate, 61-2
 Performance
 curve, pump, 18-16
 function, 11-9
 function, safety, 75-16
 graded asphalt, 76-15
 grading, 76-3
 number, 24-6
 period, 76-19
 Perigee, 72-21
 distance, 72-21
 Perihelion, 72-21
 Perimeter, wetted, 16-5, G-15
 Period (*see also type*), 76-19, 87-2
 aeration, 30-8
 all-red clearance, 73-21
 amber, 73-21
 chemical, 22-2
 cost-recovery, 87-39 (ftn)
 depreciation, 87-20
 design, 76-19
 detention, 26-6
 effective, 87-2
 electrical, 84-4
 green, 73-21
 initial, 73-20
 law of, 72-20
 maximum, 73-20
 number, 87-9
 of waveform, 9-7
 pay-back, 87-38, 87-39 (ftn)
 performance, 76-19
 rehabilitation, 76-20
 retention, 29-7
 vehicle, 73-20
 Periodic
 chart, A-84
 inventory system, 87-37
 law, 22-2
 table, 22-2, A-83, A-84
 time, 72-20
 waveform, 9-7
 Peripheral
 visibility, relative, 75-10 (fig)
 vision, 75-9
 Permanent
 hardness, 22-21, 25-4, G-11
 set, 43-3, 48-9
 Permeability, 21-2
 coefficient of, 21-2
 exposure category P, concrete, 48-10
 intrinsic, 21-2
 protection limit, 21-5
 soil, 35-23
 specific, 21-2
 test, 35-23
 Permeameter, 35-23
 Permease, 27-3
 Permissible
 exposure limit, 83-4, 83-5, 83-6, 83-8
 noise dose, 83-8 (tbl)
 Permit
 load, 74-3
 rating level, bridge, 74-3
 Permittivity
 of free space, 34-9
 relative, 34-9
 Permutation, 11-2
 circular, 5-5
 ring, 11-2
 Perpendicular
 axis theorem, 42-6
 line, 2-1, 7-8
 line principle, 2-1
 Perpetual
 inventory system, 87-37
 series, 87-7
 Persistence, 27-10
 pesticide, 32-12
 Person
 competent, OSHA, 83-4
 instrument, 81-4
 qualified, OSHA, 83-10
 -rem, G-11
 rod, 81-4
 Personal
 property, 87-20 (ftn)
 protective equipment, 83-7
 Perspective
 angular, 2-3
 oblique, 2-3
 parallel, 2-3
 view, 2-1, 2-3
 Pesticide (*see also Volatile organic compound*), 32-12
 chlorinated, 32-12
 P-waste, 32-2
 PFFS (percent of free-flow speed), 73-12
 PFR, 30-6
 pH, 22-12, G-11
 Phantom cash flow, 87-4 (ftn)
 Phase, 84-10
 angle, 84-4, 84-6
 current, 84-11
 death, 27-4
 declining growth, 27-4
 equilibrium, 72-6
 exponential growth, 27-4
 factor, 84-7

- growth, organismal, 27-3
 lag, 27-3
 logarithmic growth, 27-4
 motion impending, 72-6
 signal, 73-14, 73-15
 stationary, 27-4
 Phases, project scheduling, 86-8
 Phasor form, 3-8, 84-5
 vector, 5-2
 Phenol, 23-3 (tbl)
 Phenolphthaleim alkalinity, 22-21
 Philadelphia rod, 78-10
 Phosphorus
 ion, in water, 25-7
 removal, in wastewater, 29-3, 29-12
 Photoautotroph, 27-7
 Photobase, 78-20
 Photocell, 85-4
 Photochemical
 reaction, 32-11
 smog, 32-14
 Photoconductive device, 85-4 (ftn)
 Photoelectric effect, 85-4
 Photoemissive device, 85-4 (ftn)
 Photogenerative, 85-4 (ftn)
 Photogrammetric
 image, 78-18 (fig)
 survey, 78-5
 Photogrammetry, 78-18
 displacement method, 78-19
 nomenclature, 78-18 (fig)
 parallax measurement, 78-20
 Photosensitive conductor, 85-5
 Photosensor, 85-4
 Photosynthesis, 27-2
 Phototroph, 27-4
 Photovoltaic, 85-4 (ftn)
 cell, 85-4
 Phreatic zone, 21-1, G-11
 Phreatophytes, G-11
 Physical
 inventory, 87-37
 strain, 43-5
 stress, 43-5
 Phytoplankton, G-11
 Pi-group, 1-10
 Pick and carry, crane, 83-11
 Pickup, 85-3 (ftn), 85-4
 Pictorial drawing, 2-2 (ftn)
 Pier, 38-6, 44-12, 45-2
 shaft, G-11
 tension, 44-12 (fig)
 Piercing the corporate veil, 88-3
 PIEV time, 75-6
 Piezoelectric
 effect, 15-2, 85-4
 transducer, 85-4
 Piezometer, G-11
 nest, G-11
 ring, 15-2 (ftn)
 tube, 15-2
 Piezometric
 height, 21-2
 level, G-11
 Pilaster, 69-1
 Pile (*see also type*), 38-1, 80-4
 batter, G-2
 bearing capacity, ultimate, 38-1
 bent, G-11
 capacity, tensile, 38-4, 38-5
 composite, 38-1
 conical, 80-4 (fig)
 friction, 38-1
 group, 38-5
 group efficiency, 38-5
 grouted, 38-6
 length, effective, 38-3
 needle, 38-6
 pin, 38-6
 point-bearing, 38-1
 resistance, 38-2
 root, 38-6
 safe bearing value, 38-2
 safe load, 38-2
 settlement, 38-5
 shape, 80-4 (fig)
 small-diameter grouted, 38-6
 soldier, 39-1, G-13
 tension, 38-5
 volume, 80-4
 wedge, 80-4 (fig)
 Piling sheet, 39-4
 section modulus, 39-4
 Pilot vehicle, 74-3
 Pin-connected
 axial member, 41-12
 plate, 60-7
 pile, 38-6
 Pinned support, 41-7
 Pintle tie, 68-16
 Pipe
 asbestos-cement, 28-4
 bend, 17-36 (fig)
 bend, force on, 17-36
 black, 16-10
 branch, 17-21
 buried, loads on, 40-8
 cast-iron, 28-3, A-44
 cast-iron dimensions, A-44
 chlorinated polyvinyl chloride (CPVC), A-38
 circular, A-30
 class, 16-10
 clay, 28-4
 coating, 16-11
 coefficient, 16-8
 concrete, 28-3, A-42, A-43
 concrete sewer, dimensions, A-42, A-43
 CPVC, dimensions, A-38
 culvert, 17-19 (fig)
 dimensions, ductile iron, A-45
 ductile, dimensions, A-44
 ductile iron, A-44
 eductor, 21-4
 entrance, 17-13
 exit, 17-13
 factor, 16-8
 flexible, 40-9
 friction, 17-14
 Hazen-Williams constant, A-50
 impact factor, 40-9
 jacking, 40-11
 leg, 17-21
 lined concrete, 16-10
 loop, 17-21
 material, 16-9
 maximum velocity in, 17-3
 network, 17-24
 parallel, 17-21
 plastic, 28-4
 polyvinyl chloride (PVC), A-38, A-39, A-40, A-41
 polyvinylchloride (PVC), 16-10
 prestressed concrete, 16-10
 prestressed concrete cylinder, 16-10
 PVC, dimensions, A-38, A-39, A-40, A-41
 reinforced concrete, 16-10
 riser, 21-4
 sag, G-12
 section, 61-1
 series, 17-20
 specific roughness, A-50
 specification, 16-10
 standard, 16-10
 standard pressure classes, A-44
 standard pressure classes, ductile iron, A-45
 steel, 16-11, A-31, A-32, A-33, A-34, A-35, A-36, A-37
 steel, dimensions, A-31, A-32, A-33, A-34, A-35, A-36, A-37
 steel, modulus of elasticity, 17-39
 stiffness, 16-11
 system, multiloop, 17-24
 truss, 16-10, 28-4
 ultimate strength, 40-9
 water (*see also type*), 26-25
 Pipelines, submerged, 15-18
 Piping
 geometry factor, 17-14
 predicting limit, 21-5
 symbols, A-46
 Piston, rotary pump, 18-3 (fig)
 Pit
 ash, 24-3
 borrow, 80-5
 sheeted, G-13
 Pitch, 18-4, 72-2
 circular blade, 18-4
 helix, 7-12
 spacing, 60-2
 Pitot
 -static gauge, 17-28 (fig)
 tube, 16-4
 tube traverse, G-11
 tube-piezometer apparatus, 16-4 (fig)
 Pitting, 22-19
 Pivot point, bulkhead, 39-4
 PJP weld, 66-2, 66-9
 Placement, paving equipment, 76-7
 Placing, concrete, 49-5
 Plain
 jointed concrete pavement, 77-2
 masonry, 68-1
 sedimentation, 26-5
 sedimentation basin, 29-7
 Plaintiff, 88-6
 Plan view, 2-2
 Planar view, 2-2
 Plane, 7-6
 angle, 6-1
 beam bending, 59-2 (fig)
 complex, 3-7
 motion, 71-12
 neutral, 44-11
 of bending, 59-2
 of motion, 72-2
 survey, 78-5
 surveying, 78-1
 table survey, 78-5
 tangent, 8-5
 Planetary motion, 72-20 (fig)
 Planimeter, 2-4, G-11
 Planing, cold, 76-28
 Plant
 asphalt, 76-6
 hydroelectric generating, 18-23, 18-24
 material recovery, 31-10, 31-11
 mix, 76-6, G-11
 mix, hot, 76-10
 resource-recovery, 31-10
 waste-to-energy, 31-10 (fig)
 waste-to-steam, 31-10
 Plasma
 incineration, 34-14
 incinerator, 34-14
 Plastic, 32-12
 analysis, 47-2, 47-16
 behavior, 44-2 (ftn)
 biodegradable, 32-13
 centroid, 52-5
 compostable, 32-13
 degradable, 32-13
 design, 59-8, 59-11
 design method, 45-2
 hinge, 44-19, 47-2, 47-17
 impact, 72-17
 instability, pavement, 76-5
 limit, 35-21
 material, 14-7
 moment, 59-12, 59-13 (tbl), 59-14
 neutral axis, 64-3
 pipe, 16-9, 28-4
 region, 48-9
 section modulus, 59-11

- section modulus, plate girder, 63-2
- strain, 43-3
- test, 43-10, 43-11
- type, 32-13
- waste, 32-12
- water pipe, 26-25
- Plasticity, 35-3
 - index, 35-22
 - test, 35-4
- Plat, G-11
- Plate
 - anchor bolting, small column
 - base, 61-11 (fig)
 - beam bearing, 59-18
 - beam bearing, nomenclature, 59-19 (fig)
 - bearing value test, 35-31
 - bracket, 65-5, 65-6
 - column base, 61-9, 61-10 (fig)
 - connection, 60-7
 - flat, 45-19, 51-5
 - flat, uniform pressure, 45-20 (tbl)
 - girder, 59-2, 63-1 (fig), 63-2, 63-3, 63-5
 - girder, concentrated force, 63-5
 - girder, flange, 63-2
 - girder, web, 63-2
 - jet force on, 17-34
 - lamella, 26-6
 - orifice, 17-30
 - pin-connected, 60-7
 - width tolerance, 58-3
- Platform, slewing, 83-9, 83-10
- Platinum resistance thermometer, 85-5
- Platoon, 73-21
 - length, 73-20
 - ratio, 73-16
- Platykurtic distribution, 11-14
- Plow steel, 45-21 (ftn)
- Plug
 - cock valve, 16-12
 - flow, 30-6
 - flow mixing model, 26-10
 - flow reaction, 30-6
 - valve, 16-12
 - valve, eccentric, 16-12
 - weld, 66-2
- Plugging, 29-13, 34-19
- Plumb
 - bob, 78-9
 - point, 78-19
- Plummet, optical, 78-9
- Plunger pump, 18-2
- Plus
 - declination, 78-12
 - sight, 78-10
 - station, 78-9
- PMBOK Guide, 86-1
- PMF, 20-6
- PMP, 20-6
- Pneumatic roller, 76-8
- Pocket penetrometer test, 83-3
- pOH, 22-12, G-11
- Point
 - access, 73-3
 - balance, 80-6, 80-7 (fig)
 - balanced draft, 34-10
 - bearing pile, 38-1
 - break-even, 87-38
 - bulk modulus, 14-14
 - capacity, 38-2
 - cloud, 24-7
 - contraflexure, 8-2, 44-17
 - critical, 8-2, 28-10, 28-11
 - cut-over, 87-23 (ftn)
 - dew, 24-14
 - extrema, 8-2
 - extreme, 8-2
 - fixed, motion about, 72-2
 - flash, 24-5 (ftn)
 - force, 41-2
 - gold, 85-6 (ftn)
 - grade, 80-3, 81-3, 81-5 (fig)
 - ice, 85-6 (ftn)
 - inflection, 8-2, 44-17
 - load surcharge, 37-8
 - locus, 7-2
 - maxima, 8-2
 - maximum, 8-2
 - minima, 8-2
 - minimum, 8-2
 - null, 34-10
 - of application, 5-1
 - of beginning of curve, 79-3
 - of common curvature, 79-6
 - of continuing curve, 79-6
 - of contraflexure, 7-2
 - of counterflexure, bulkhead, 39-4, 39-5
 - of curvature, 79-3
 - of end of curve, 79-3
 - of inflection, 7-2
 - of inflection, flexible bulkhead, 39-4, 39-5
 - of rotation, 79-8
 - of rotation, bulkhead, 39-4
 - of sale system, 87-37
 - of tangency, 79-3
 - operating, 18-17
 - oxygen, 85-6 (ftn)
 - plumb, 78-19
 - pour, 24-7
 - pressure at, 40-2 (fig)
 - principal, 78-19
 - principal, photograph, 78-18
 - saddle, 7-2
 - set, 22-23
 - silver, 85-6 (ftn)
 - singular, 8-1
 - slope form, 7-5
 - source, G-11
 - stagnation, 16-4
 - steam, 85-6 (ftn)
 - sulfur, 85-6 (ftn)
 - tangent, 7-2
 - terminal, 5-1
 - to-area rain conversion factors, 20-18
 - turning, 79-12
 - vertical, 78-19
 - yield, 43-3, 58-2
- Poise, 14-7
- Poisoning, 34-19
- Poisson
 - arrivals per cycle, 73-17 (tbl)
 - distribution, 11-5
- Poisson's ratio, 43-4, 58-2
 - approximate value, 43-4 (tbl)
 - concrete, 48-6
- Polar
 - amine, 22-23
 - coordinate system, 7-3 (fig) (tbl)
 - form, 3-8, 7-5
 - form, vector, 5-2
 - moment of inertia, 42-6
- Pole, 75-13
 - breakaway, 75-13
 - weakened, base, 75-13
- Poling, 39-1
- Polishing
 - characteristic, pavement, 76-4
 - condensate, 22-24
 - filter, 29-12
 - pavement, 76-5
 - pond, 29-4
- Pollutant, 32-2, G-11
 - air, 32-2
 - criteria, 32-2
 - hazardous air, 32-2
- Pollution
 - control, 32-1
 - generator, 32-2
 - industrial wastewater, 34-23 (tbl)
 - prevention, 32-1
 - source, 32-2
- Polychlorinated biphenyl, 32-12
- Polyelectrolyte, 26-8
- Polygon
 - formula, A-7, A-8
 - frequency, 11-10
 - mensuration, A-7
 - method, 5-3
- Polyhedra, properties, A-9
- Polymer, 26-8, 32-12
 - asphalt, 76-5
 - asphalt modifier, 76-5
 - concrete, 48-7, 77-13
 - modified asphalt, 76-5
 - organic, 26-8
 - portland cement concrete, 48-7
 - synthetic, 26-8, 26-9
 - water treatment, 26-8
- Polymictic, G-11
- Polynomial, 3-3
 - characteristic, 4-8
 - degree, 3-3
 - factoring, 3-4
 - form, standard, 3-3
 - graphing, 3-4
 - inspection, 3-4
 - Lagrangian interpolating, 12-2
 - Newton's interpolating, 12-3
 - special case, 3-4
- Polyphase motor, A-173
- Polyphosphate, 25-7
- Polyprotic acid, 22-17
- Polysaccharide, 23-2 (tbl)
- Polystyrene resin, 22-22
- Polytropic
 - compression, 15-14
 - exponent, 15-14
- Polyvinyl chloride (PVC)
 - pipe, A-38, A-39, A-40, A-41
- Polyvinylchloride (PVC)
 - pipe, 16-10
- Pond
 - aerobic, 29-4
 - anaerobic, 29-4
 - facultative, 29-4
 - maturation, 29-4
 - oxidation, 29-4
 - polishing, 29-4
 - stabilization, 29-4
 - tertiary, 29-4
- Pop action, 16-12
- Population, 11-3
 - equivalent, 28-3
 - growth, 3-11
 - standard deviation, 11-13
- Pore
 - pressure, 35-15, 37-9, 38-3, 40-5
 - space, percent, 35-8
 - squeeze liquid, 31-7
 - velocity, 21-4
 - water pressure, 35-14
- Porosity, 21-2, 35-7, G-11
 - effective, 21-2
- Porous filter, 21-5
- Portland cement, 48-1
 - concrete, 48-1
 - concrete pavement, 77-1
 - high-early strength, 48-1
 - low-heat, 48-2
 - modified, 48-1
 - normal, 48-1
 - sulfate-resistant, 48-2
 - type, 48-1
 - type I, 48-1
 - type II, 48-1
 - type III, 48-1
 - type IV, 48-2
 - type V, 48-2
- Position
 - absolute, 71-10
 - angular, 71-7
 - dilution of, 78-6
 - relative, 71-10
 - surveying, 78-7
 - vector, 41-3

- Positioning
 - differential, 78-6
 - relative, 78-6
- Positive
 - displacement pump, 18-2
 - displacement pump, reciprocating, 18-2
 - element, 85-7
 - guidance, 75-10
 - guidance technique, 75-9
 - temperature coefficient, 85-5
- Post
 - chlorination, G-11
 - end, 41-12
 - tensioned concrete, 56-2
 - tensioned construction, 56-2
- Posted load, 74-3
- Posting, load, 74-2
- Potable, G-11
- Potential
 - energy, 1-3, 13-3, 16-2
 - stream, 17-3
- Potentiometer, 84-2, 85-3 (ftn)
 - circuit, 85-3 (ftn)
 - transducer, 85-3
- Potentiometric sensor, 85-3
- Pothole, 76-5
- Pound, 1-1
 - force, A-3
 - mole, 22-5
- Poundal, 1-4
- Pour point, 24-7
- Powdered activated carbon, 29-13
- Power, 3-5, 13-6
 - aeration, 29-4, 30-9
 - angle, 84-7
 - blower, 29-4
 - conversion, 13-6
 - conversion factor, A-1, A-2
 - conversion, SI, A-3, A-5
 - curve, 43-5
 - density, ESP, 34-10
 - design, 72-7 (ftn)
 - electrical, 84-3, 84-6
 - factor, 18-10, 84-7, 84-9
 - friction, 18-9
 - hydraulic, 18-7
 - law, 1/7, 16-8
 - law model, 17-12
 - law, viscosity, 17-12
 - line hazard, 83-7
 - line, safety, 83-7
 - number, 26-11
 - of the test, 11-15
 - phase, 84-11
 - propulsion, 75-3
 - pump, 18-2, 18-7
 - pumping, well, 21-7
 - series, 8-8
 - ton of explosive, 1-7
 - turbine, 17-36, 18-22
 - unit stream, G-15
 - water, 18-7
- Powerhouse, 18-24
- Pozzolan
 - activity, 77-12
 - additive, 48-2
- ppb, 22-11
- PPCC, 48-7
- ppm, 22-11
- Practical scaling index, 26-19
- Prandtl number, 1-9 (tbl)
- Prandtl's boundary layer theory, 17-44
- Pre-chlorination, G-11
- Precast concrete deck slab, girder, 51-9
- Precedence table, 86-10
- Prechlorination, 26-3
- Precipitation, 20-1, 22-11
 - average, 20-2
 - chemical, G-4
 - phosphorus, 29-12
 - probable, maximum, 20-6
 - rate, 34-9
 - softening, 22-22, 26-15, 26-17
- Precipitator, electrostatic, 34-8
- Precise
 - estimate, 85-2
 - level, 78-10
 - rod, 78-10
- Precision, 85-2
 - experiment, 11-11
 - ratio of, probable, 78-2
- Preconsolidated
 - curve, 40-4
 - segment, 40-4
- Preconsolidation pressure, 35-25
- Precursor, 25-9
 - disinfection by-product, 25-10
 - smog, 32-14
- Predicted average crash frequency, 75-17
- Predictive analysis, safety, 75-2
- Prefix, SI, 1-7
- Preliminary treatment, 26-2, 29-3
- Preload
 - bolt, 45-12, 65-3
 - force, 45-12
- Preloaded soil, 35-24
- Premature exhaustion, 29-13
- Prerequisite of privity, 88-7 (ftn)
- Presedimentation, 26-3
- Present
 - value, 87-5 (ftn)
 - value, net, 87-5 (ftn)
 - worth, 87-5, 87-11
 - worth method, 87-14, 87-15
- Press
 - belt filter, 30-18
 - fit, 45-6
 - fit, stress concentration factor, 45-9 (tbl)
 - hydraulic, 15-15
- Pressure, 14-2
 - absolute, 14-3
 - active, G-1
 - apparatus, osmotic, 14-10
 - at a depth, 1-3, 15-6 (ftn)
 - at point, 40-2 (fig)
 - atmospheric, 14-3
 - average, 15-7
 - barometric, 14-3
 - center of, 15-5, 15-9, 15-10, 41-5
 - classes, ductile iron pipe, A-45
 - classes, iron pipe, A-44
 - collapsing, 45-5 (ftn)
 - conduit, 16-5
 - conversion, SI, A-3, A-4
 - dead load, 40-8, 40-9
 - differential, 14-3
 - drag, 17-41
 - drop, endpoint, 22-23
 - drop, friction, 17-4 (ftn)
 - drop, steel pipe, A-55
 - drop, water, steel pipe, A-55
 - earth, 37-2
 - earth, active, 37-2, 37-3
 - earth, passive, 37-2
 - effective, 37-9, 40-5
 - energy, 16-2
 - external, 15-15
 - filter, 26-14
 - filtration, 30-18
 - flow, 16-5
 - fluid, 14-2
 - from applied load, 40-2
 - from concrete, 49-8
 - from gas, 15-13
 - gage, 14-3, 15-2
 - gage, Bourdon, 15-2
 - head, 18-6
 - hydrostatic, 15-4, 37-9
 - lateral, concrete, 49-8
 - mean effective, 85-14
 - measurement, 15-1
 - measuring device, 15-2 (tbl)
 - meter, 14-2 (ftn)
 - multiple liquid, 15-12
 - neutral, 21-9
 - on a dam, 15-11
 - on buried pipe, 40-8
 - on curved surface, 15-10
 - on plane surface, 15-6, 15-7, 15-9
 - osmotic, 14-10
 - partial, 31-6
 - passive, G-11
 - pipe, buried, 40-8
 - pore, 35-15, 37-9, 38-3, 40-5
 - preconsolidation, 35-25
 - pump surge, 49-8
 - regulator, 26-25
 - relief device, 16-12
 - relief valve, 17-39
 - safe bearing, 36-2
 - saturation, 14-9
 - soil, at-rest, 37-5
 - soil, backward, 37-2
 - soil, compressed, 37-2
 - soil, depth, 40-1
 - soil, forward, 37-2
 - soil, tensioned, 37-2
 - standard temperature and, 24-2
 - surface, 15-6, 15-7, 15-9, 15-10
 - total, 16-2, 37-9
 - transverse, 17-28
 - unit, 14-2 (fig)
 - uplift, 21-9
 - vapor, 14-9
 - water service, 26-25
- Pressurized
 - fluidized-bed combustion, 24-5
 - liquid, 15-15
 - tank, 17-18
- Prestress
 - loss, 56-3
 - maximum, 56-6
 - tendon, 56-3
- Prestressed
 - beam, analysis, 56-10
 - beam deflection, 56-4
 - concrete, 56-2
 - concrete cylinder pipe, 16-10
 - concrete pavement, 77-2
 - concrete pipe, 16-10
 - section, shear, 56-11
- Prestressing
 - effect on simple beam, 56-2 (fig)
 - fully, 56-3
 - midspan deflections from, 56-5 (fig)
 - partial, 56-3
 - steel ratio, 56-10
 - tendon, ASTM, 56-5 (tbl)
 - tendon, stress, 56-7
- Presumptive test, G-11
- Pretension
 - bolt, 65-3
 - loss, creep, 56-4
 - loss, shrinkage, 56-3
- Pretensioned
 - concrete, 56-1, 56-2
 - connection, 65-2
 - construction, 56-2
- Pretensioning, DTI washer, 58-4
- Pretreatment, 26-2
- Prevention, pollution, 32-1
- Prewash, air, 26-14
- Price-earnings ratio, 87-36
- Pricing, congestion, 73-27
- Primacy, 75-10
- Primary
 - combustion chamber, 34-13
 - consolidation, 40-3, 40-4
 - consolidation rate, 40-5
 - creep, 43-16
 - dimension, 1-7
 - structure, 47-7
 - treatment, 29-3
 - unit, 1-7

- Prime
 - coat, G-11
 - contractor, 88-4
 - cost, 86-9, 87-33
 - mover, 18-9 (ftn)
- Primer, red, 16-11
- Principal
 - axis, 42-8, 59-15, 70-2
 - contract, 88-3
 - moment of inertia, 42-8
 - organic hazardous constituent, 34-13
 - point, 78-19
 - point, photograph, 78-18
 - stress, 44-5
 - view, 2-2
- Principle
 - Archimedes', 15-16
 - D'Alembert, 72-5
 - impulse-momentum, 17-33, 72-15
 - Le Châtelier's, 22-13
 - of proportionality, 47-2
 - perpendicular line, 2-1
 - virtual work, 47-3
 - work-energy, 13-3, 13-4, 45-20
- Priority
 - ethical, 89-2
- Prism, 80-4
 - level, 78-10
 - test method, 67-4
- Prismoid, 80-4
- Prismoidal formula, 80-5
- Privity of contract, 88-7
- Probabilistic problem, 87-30
- Probability
 - complementary, 11-4
 - density function, 11-4
 - joint, 11-3
 - of failure, conditional, 11-9
 - of flood, 20-6
 - success, 11-3
 - theory, 11-2
- Probable
 - error, 78-2
 - error of the mean, 78-2
 - maximum flood, 20-6
 - maximum precipitation, 20-6
 - maximum rainfall, G-11
 - ratio of precision, 78-2
 - value, 78-2
- Probe
 - direction-sensing, 17-27
 - static pressure, 17-27
- Problem
 - initial value, 10-1
 - loan repayment, 87-4
 - mixing, 10-8
 - rate of return, 87-4
 - three-reservoir, 17-22
- Procedure
 - diagnosis, transportation network, 75-17
 - Johnson, 45-3
 - Marshall mix test, 76-11
 - Modified Angoff, -32
- Process
 - absorption, 34-2
 - anabolic, 27-9
 - base exchange, 22-22
 - bioactivation, G-3
 - biofilm, 26-14
 - biosorption, G-3
 - catabolic, 27-9
 - control, statistical, 11-16
 - cost accounting, 87-36
 - curing, 49-5
 - economic analysis, 75-18
 - efficiency, BOD, 30-6
 - group, 86-1
 - ion exchange, 22-22, 26-17
 - Krause, G-9
 - lime-soda ash, 26-15
 - nitrification/denitrification, 29-12
 - reacted asphalt, 76-29
 - rubberized asphalt, 76-29
 - SAW, 66-1
 - SMAW, 66-1
 - unit, G-15
 - waste, 32-2
 - zeolite, 22-22, 26-17
- Processing
 - attention and information, 75-9
 - joint, 28-2
- Prochloraz, 32-12
- Proctor test, 35-18, 35-19
- Producer
 - gas, 24-8 (ftn)
 - risk, 11-14
- Product, 22-6
 - cross, 41-3
 - dot, 5-3
 - incomplete combustion, 34-14
 - ion, 22-15
 - mixed triple, 5-4, 5-5
 - of inertia, 42-7, 70-2
 - scalar, 5-5
 - solubility, 22-17
 - triple cross, 5-5
 - triple, scalar, 5-5
 - triple, vector, 5-5
 - vector, cross, 5-4 (fig)
 - vector, dot, 5-3 (fig)
 - waste decomposition, 27-10
- Professional
 - corporation, 88-2
 - engineer, 90-1
 - engineering exam, 90-1
 - limited liability company, 88-3
 - services cost, 86-5
- Profile
 - auxiliary view, 2-2
 - depth, 19-22
 - diagram, 80-6
 - drag, 17-41
 - velocity, 16-8
- Profiling, 76-28
- Profit, 87-37
 - and loss statement, 87-34
 - and loss statement, simplified, 87-35 (fig)
 - flow through, 88-2
 - gross, 87-37
 - margin, 87-36
 - margin ratio, 87-36
 - net, 87-37
 - project, 86-6
- Program evaluation and review
 - technique, 86-14
- Programming, 86-8
- Progressive method, landfill, 31-2
- Project
 - coordination, 86-15
 - documentation, 86-16
 - management, 86-1
 - monitoring, 86-15
 - overhead, 86-6
 - scheduling, 86-8
 - transportation, 75-15
- Projected bearing area, 60-7
- Projectile, 71-4
 - motion, 71-4
 - motion equations, 71-5 (tbl)
- Projection, 2-3
 - cabinet, 2-2, 2-3
 - cavalier, 2-2, 2-3
 - clinographic, 2-3
 - factor, growth, 76-17
 - fee, 86-2
 - method, 87-10
- Projector, 2-1
- Prokaryote, 27-1
- Prompt-NOx, 32-9
- Prony brake, 85-13
- Proof
 - alcohol, 24-7
 - load, bolt, 45-9, 45-13
 - strength, 45-9, 45-13
 - stress, 43-3 (ftn)
 - test, 11-9
 - test interval, 11-9
- Proper
 - polynomial fraction, 3-6 (ftn)
 - subset, 11-1
- Properties
 - air, A-21
 - atmospheric air, A-22
 - atmospheric pressure, air, A-21
 - carbon dioxide, 31-6 (tbl)
 - concrete components, 49-1
 - elements, A-83
 - gas, A-95
 - masonry, 67-3
 - masonry cross
 - sections, A-153, A-154, A-155, A-156
 - metals, A-116, A-117, A-118
 - methane, 31-6 (tbl)
 - mortar, 67-5
 - structural aluminum, A-115
 - structural magnesium, A-115
 - structural steel, A-115
 - structural steel, high temperature, A-151
 - water, A-16, A-17, A-18, A-19
 - water treatment chemicals, A-103
 - weld groups, A-125
- Property
 - business, 87-20 (ftn)
 - class, bolt, 45-9, 45-10
 - coal, 24-5 (tbl)
 - concrete components, 49-2
 - fuel, 24-6 (tbl)
 - fuel oil, 24-6
 - intangible, 87-20 (ftn)
 - metallic, 22-2
 - personal, 87-20 (ftn)
 - real, 87-20 (ftn)
 - residential, 87-20 (ftn)
 - solution, 22-10
 - steel, 58-2
 - tangible personal, 87-20 (ftn)
- Propiconazole, 32-12
- Proportional
 - region, 43-3
 - strain, 43-3
 - weir, 19-14
- Proportionality
 - limit, 43-3
 - principle of, 47-2
- Proportions
 - arbitrary, method, 49-2
 - law of definite, 22-4
 - law of multiple, 22-4
- Propped cantilever beam, 46-1
- Proprietorship
 - single, 88-1
 - sole, 88-1
- Propulsion
 - jet, 17-34
 - power, 75-3
- Protection
 - cathodic, 48-10
 - fall, 83-7, 83-9
 - head, 83-7
 - hearing, 83-8
 - impact, 83-7
 - scour, 19-13, 19-14
- Protein, 28-14
- Protista, 27-4
- Protium, G-11
- Prototype, 17-45
- Protozoa, 27-8, G-11
 - flagellated, 27-8
- Proximate analysis, 24-2
- PRT time, 75-6
- Prying action, 65-6, 66-8
- Pseudocomponent, 14-16 (ftn)
- Pseudokinematic GPS surveying, 78-6
- Pseudoplastic fluid, 14-7
- psid, 14-3
- Psychrophile, 27-6 (tbl)

PTSF (*see* Percent time following), 73-12

Public
 corporation, 88-2
 dealing with, 89-3
 land system, 78-20

Publicly owned treatment works, 34-22

Puckorius scaling index, 26-19

Puffing, 34-10

Pull
 anchor, 39-5
 drawbar, 75-4
 line, 83-10
 -out capacity, 38-5

Pulley, 41-11
 advantage, 41-11
 block, mechanical advantage, 41-11
 efficiency, 41-11
 fixed, 41-11
 free, 41-11
 loss factor, 41-11

Pulsation
 damper, 18-2
 stabilizer, 18-2

Pump (*see also type*), 17-15, 18-2
 centrifugal, 18-2, 18-4 (fig)
 characteristic, 18-2, 18-12
 characteristic curve, 18-16 (ftn)
 curve, 18-16
 cylinder-operated, 18-2
 diaphragm, 18-3
 direct-acting, 18-2
 double-acting, 18-2
 double-suction, 18-4
 duplex, 18-2
 dynamically similar, 18-20
 efficiency, 18-9
 efficiency versus specific speed, 18-9 (fig)
 ejector, 18-2
 head added, 17-15
 homologous, 18-13
 jet, 18-2
 kinetic, 18-2
 mixed-flow, 18-4 (ftn)
 multiple-stage, 18-4
 nonclog, 18-5
 operating in parallel, 18-18 (fig)
 operating in series, 18-18 (fig)
 overall efficiency, 18-9
 PD, 18-2
 performance curve, 18-16 (fig)
 piston rotary, 18-3 (fig)
 plunger, 18-2
 positive displacement, 18-2
 power, 18-7
 power factor, sludge, 18-5
 power versus specific gravity, 18-5
 power, sludge, 18-5
 reciprocating action, 18-2
 reciprocating positive displacement, 18-2
 rotary action, 18-2
 sewage, 18-4
 shaft loading, 18-11
 similarity, 18-20
 simplex, 18-2
 single-acting, 18-2
 single-suction, 18-4
 sludge, 18-5
 steam, 18-2
 surge pressure, 49-8
 triplex, 18-2
 velocity ratio, 18-3
 wastewater, 18-5, 29-3

Pumped storage, 26-24

Pumping
 hydrocarbon, 18-21
 membrane, 27-3
 other liquids, 18-20
 pavement, 76-5
 power multiplicative factor, 18-5 (tbl)
 power, well, 21-7

Pumps
 in parallel, 18-18
 in series, 18-18

Punched hole, 60-2

Punching shear, 55-3

Punitive damages, 88-6, 88-7

Purchase order, 88-3

Pure translation, 72-2

Purification
 dilution, 28-10
 self-, 28-10

Purity, 26-9

Purlin, 59-2

Purple bar, 48-10

Putrefaction, G-11

PVC
 pipe, 16-9, 28-4, A-38, A-39, A-40, A-41
 pipe dimensions, A-38, A-39, A-40, A-41

Pycnometer, 76-8, G-11

Pyramid
 method, 76-14
 rectangular, 80-4 (fig)

Pyritic sulfur, 24-3

Pyrolysis, 32-13

Pythagorean
 theorem, 6-2

Péclet number, 1-9 (tbl)

Q

q
 -curve, G-12
 -system, 35-33

Q-system, 47-3

Q-test, 35-28

Quad (unit), 13-1

Quadrant, 6-3
 sign of function, 6-3

Quadratic
 equation, 3-3, 7-9
 velocity-dependent force, 72-19

Qualified
 individual, ADA, 82-9
 person, OSHA, 83-10

Quality
 break-even, 87-38 (fig)
 factor, joint, 16-10
 of boiler feedwater, 22-24

Quantitative predictive analysis, 75-2

Quantity
 economic order, 87-43
 ideal, 24-9
 sludge, wastewater, 30-13
 sludge, water treatment, 26-12
 stoichiometric, 24-9
 wastewater, 28-1, 28-2

Quarter
 -bridge, 85-11
 -wave symmetry, 9-7 (tbl)

Quartile, 11-12

Quartz, 35-32
 -crystal transducer, 15-2

Quenched and tempered alloy steel, 58-2

Queue, 73-27

Queuing
 delay, 73-14
 model, 73-27
 theory, 73-27

Quick
 mixer, 26-10
 ratio, 87-35
 test, 35-28

Quicklime, 26-9

Quicksand, 36-2

Quiet sedimentation basin, 26-6

Quotient, respiratory, 27-11

R

R-test, 35-28

R

-control chart, 11-16
 -value, 35-32
 -value, soil, 76-20

Race, tail, 18-24, G-14

Rack, 29-6
 trash, 29-6

Rad, 6-1 (ftn), G-12

Radial
 component, 71-9
 displacement method, 78-19 (fig)
 -flow impeller, 18-4, 26-11
 -flow reaction turbine, 18-23
 -flow turbine, 18-22, 18-23
 interference, 45-6
 strain, 45-6
 stress, 35-26
 velocity, 71-9

Radian, 6-1
 hyperbolic, 6-5

Radiation
 absorbed dose, 6-1 (ftn)
 loss, 24-16
 ultraviolet, 26-21

Radical, 22-4, G-12

Radioactive decay, 10-9

Radiographic inspection, 82-4

Radiography, 43-12

Radius
 hydraulic, 16-5, 19-2, G-8
 loaded tire, 75-3
 of gyration, 42-6, 45-2, 59-3, 61-4,
 70-2, A-114
 of gyration, least, 42-6, 61-4
 of influence, 21-5, 31-6
 turning, 73-3

Radon, 32-13

Raft, 36-9
 on clay, 36-9
 on sand, 36-11

Railing, safety, 75-13

Railroad
 rolling stock, 75-4
 superelevation, 79-10

Railway
 curve, 79-3
 geometric design, 79-21
 vertical curve, 79-22

Rain
 acid, 32-4
 areal, 20-17
 gross, 20-17
 net, 20-7 (ftn), 20-17, G-10

Rainfall
 gross, 20-17
 intensity, 20-4
 mass curve, 20-2
 probable maximum, G-11
 total, 20-17

Rainwater runoff, 32-14
 highway, 32-14

Ram hydraulic, 15-15

Ramp
 density, total, 73-9
 loop, 73-25

Ramping, 75-13

Random
 error, 85-2
 number, A-82

Range, 11-13
 diagram, crane, 83-11
 error limits, 85-7
 number, 78-20
 pace, 73-4
 table, crane, 83-11

Ranger, G-12

Rank
 column, 4-5 (ftn)
 matrix, 4-5
 percentile, 11-12
 row, 4-5 (ftn)
 speed, 73-4

Rankine earth pressure theory, 37-3, 37-5
 Ranking
 alternative, 87-17
 simple, 75-17
 Raoult's law, 14-16
 Rap, rip, G-12
 Rapid
 cure, asphalt, 76-2
 flow, 19-16, G-12
 mixer, 26-10
 sand filter, 26-13, 29-12
 static mode, 78-6
 Rapper, 34-8
 Rare earth, 22-3
 Raster image, 78-7
 Rate
 15 min passenger car equivalent
 flow, 73-10
 accident, 75-11, 83-2
 arithmetic growth, 3-11
 average annual growth, 3-11
 braking, 75-6
 burning, 31-10
 constant growth, 3-11
 constant, BOD removal, 29-5
 constant, deoxygenation, 28-8
 constant, mixing, 26-10
 constant, reoxygenation, 28-7
 crash, 75-16 (ftn)
 creep, 43-16
 DART, 83-2
 days away, 83-2
 decay, Velz, 29-11
 exponential growth, 87-4
 flow, 26-13, 73-6, 73-8
 growth, 3-11
 growth, maximum specific, 30-7
 heat release, 31-10
 injury incidence, 83-2
 lapse, G-9
 learning curve, 87-43
 linear growth, 3-11
 loading, 26-13
 lost time case, 83-2
 lost workday, 83-2
 nominal interest, 87-28
 of change, 8-1
 of consolidation, 40-5
 of flow, 73-5, 73-6
 of flow, pedestrian, 73-21
 of grade change per station, 79-12
 of increase, lateral acceleration, 79-18
 of oxygen transfer, 30-9
 of reaction, 22-13
 of return, 87-4, 87-12, 87-14, 87-17
 of return method, 87-17
 of return on added investment
 study, 87-17
 of return problem, 87-4
 of return, external, 87-12
 of return, internal, 87-12
 of return, minimum attractive, 87-16
 of return, multiplicity, 87-12 (tbl)
 of shear formation, 14-6, 14-7
 of strain, 14-6
 of substrate utilization, 30-7
 overflow, 26-6, 29-7
 per annum, 87-28
 precipitation, 34-9
 recharge, 31-7
 recirculation, 30-10
 saturation flow, 73-15
 service flow, 73-5, 73-10
 settling, 29-7
 severity, 83-2
 shear, 14-6, 17-14
 sludge recycle, 30-11
 sludge return, 30-10
 spreading, 76-8
 spring, 45-20
 superelevation, 72-8, 79-7
 superelevation runoff, 79-8

 surface loading, 29-7
 total incidence, 83-2
 transition, 79-8
 weir loading, 29-7
 Rated
 point, pump, 18-16
 value, motor, 84-13
 Rating
 curve, G-12
 factor, bridge, 74-2
 level, operating, bridge, 74-3
 level, permit, bridge, 74-3
 level, superload, bridge, 74-3
 load and resistance factor, method,
 bridge, 74-4
 load factor, bridge, 74-3
 load, bridge, 74-2
 SK, 29-8
 system, rock mass, 35-33
 tonnage, railroad, 75-4
 waviness spacing, 2-4
 waviness width, 2-4
 Ratio
 air-to-cloth, 34-5
 air/fuel, 24-9
 aspect, 17-40
 available compressive stress versus
 slenderness, 61-4 (fig)
 benefit-cost, 87-16
 beta, 17-29
 bifurcation, G-3
 California bearing, 35-29, 76-20
 cement-water, 49-2
 centrifugal, unbalanced, 79-7
 circular channel, 19-5 (tbl), A-75
 common, 3-11
 compression, 40-4
 cornering, 79-7
 corona current, 34-10
 corona power, 34-10
 critical v/c , 73-15
 current, 87-35
 depth-thickness, 63-2
 differential gear, 75-3
 dust-to-binder, 76-15
 effective green, 73-15
 endurance, 43-9
 energy-efficiency, 13-6 (ftn)
 fatigue, 43-9
 filter, 34-5
 flow, 73-15
 food-to-microorganism, 30-5
 friction, 35-17
 gross air-to-cloth, 34-5
 lane occupancy, G-9
 lateral, 79-7
 length, 17-45
 liquid-gas, venturi scrubber, 34-18
 mass-to-power, 75-8
 modular, 44-20, 50-15, 56-3, 56-4, 57-3
 net air-to-cloth, 34-5
 nitrogen-oxygen, 24-8
 of exceedance, 11-12
 of precision, 78-2
 of specific heat, 15-14
 of transformation, 84-6
 overconsolidation, 35-25
 partial pressure, 24-2
 platoon, 73-16
 Poisson's, 43-4, 58-2
 price-earnings, 87-36
 profit margin, 87-36
 recirculation, 29-9
 recompression, 40-4
 recycle, 30-10
 reinforcement, 50-12
 reinforcement, beam,
 minimum, 50-6, 55-4
 reinforcement, footing, minimum, 55-4
 return on investment, 87-36
 saturation flow, 73-15
 severity, 75-11

 slenderness, 45-3, 52-1, 60-4, 61-2
 slenderness, critical, 61-4
 slenderness, steel tension member, 60-6
 steel, 50-8, 50-12
 steel, prestressing, 56-10
 stress, cyclic, 40-11
 test, 3-12
 transmission gear, 75-3
 void, 35-7
 volume-capacity, 73-5, 73-15
 water-cement, 49-1
 width-thickness, 61-6, 63-3
 Rational
 equation, 20-14
 formula, 20-14
 method runoff C -coefficient, A-81
 method, modified, 20-20
 method, peak runoff, 20-14
 real number, 3-1
 Rationalization, 3-8
 Rattler test, Los Angeles, 76-4
 Raveling, pavement, 76-5
 Raw material, 87-33
 Ray, 6-1 (ftn)
 RCP, 28-3
 RDF, 31-10
 Reach, 19-2, G-12
 Reactance, 84-5
 capacitive, 84-5
 Reactant, 22-6
 limiting, 22-9
 Reacted asphalt process, 76-29
 Reaction, 41-7
 biologic, 27-11
 chemical, 22-6
 combustion, 24-9
 combustion, ideal, 24-9 (tbl)
 determinate, 41-8
 dynamic, 72-5 (ftn)
 endothermic, 22-18
 enthalpy of, 22-18
 exothermic, 22-18
 kinetics, 22-13, 22-14
 order, 22-13
 oxidation-reduction, 22-7
 rate, 22-13
 rate constant, 22-14, 34-7
 rate, zero order, 22-14
 redox, 22-7, G-12
 reversible, 22-13
 sequencing, batch, 30-4
 speed, 22-13
 stoichiometric, 22-8, 22-9
 turbine, 18-22, 18-23
 two-dimensional, 41-8
 velocity, 22-13
 Reactive
 power, 84-6
 substance, 32-2
 Reactivity, alkali-aggregate, 48-2
 Reactor, 30-6
 biological, rotating, 29-11
 continuous-flow stirred tank, 30-6
 tank, 34-7
 volume, 30-7, 30-8
 Readily achievable, 82-11
 Reading
 rod, 81-4
 stadia, 78-8
 Reaeration, 28-7
 Real
 fluid, 14-2
 losses, 84-17
 number, irrational, 3-1
 number, rational, 3-1
 power, 84-6
 property, 87-20 (ftn)
 Reasonable accommodation, 82-9
 Reasonably available control
 technology, 34-2
 Rebar, 48-9
 area, 50-8, 51-3

- development length, 67-7
- epoxy-coated, 48-10, 55-5 (tbl)
- masonry, 67-6
- pavement, 77-6, 77-7
- protection, 48-10
- zinc-coated (galvanized), 55-5 (tbl)
- Rebound, 72-17
 - angle, 72-17
 - curve, 35-24
 - height, 72-17
 - stationary plane, 72-17 (fig)
 - test, 43-14
 - velocity, 72-17
- Receipt, 87-3
- Receivable
 - average age, 87-35
 - turnover, 87-35
- Recessed plate filter press, 30-18
- Recession curve, 20-7
- Recharge rate, 31-7
- Reciprocating
 - action pump, 18-2
 - positive displacement pump, 18-2
- Reciprocity, 90-2
- Recirculation, 29-9
 - flue gas, 34-10
 - rate, 30-10
 - ratio, 29-9
- Reclamation, 29-13
- Recommended
 - Standards for Sewage Works, A-104 (ftn), A-105 (ftn)
 - weight limit, 83-7
- Recompression
 - curve, 40-4
 - index, 40-4
 - ratio, 40-4
 - segment, 40-4
- Reconsolidation index, 35-25
- Recordable incident, OSHA, 83-2
- Recorder, automatic traffic, 73-6
- Recovery, 43-3
 - closed-loop, 34-4
 - depreciation, 87-26
 - leachate, 31-8
 - method, capital, 87-15, 87-16
 - open-loop, 34-4
 - solvent, 34-3, 34-4
- Recreation vehicle, 73-7
- Rectangular
 - channel, 19-6, 19-8, 19-17
 - channel, normal depth, 19-6
 - coordinate system, 7-3
 - form, 3-7
 - form, vector, 5-2
 - hyperbola, 7-12
 - moment of inertia, 42-3
 - pyramid, 80-4 (fig)
 - rosette, 85-12
 - Surveying System, 78-20
 - tubing, 61-1
 - weir, submerged, 19-11
- Rectified sinusoid, 84-5
- Rectilinear system, 71-2
- Rectum, latus, 7-10, 7-11
- Recurrence interval frequency, 20-5
- Recycle
 - rate, sludge, 30-11
 - ratio, 30-10
- Recycled
 - asphalt pavement, 76-3, 76-6, 76-28
 - pavement, PCC, 77-12
- Recycling
 - asphalt pavement, 76-28
 - cold, in-place, 76-28
 - hot mix, 76-28
 - microwave asphalt, 76-28
 - plastic, 32-12
 - surface, 76-28
 - wastewater, 29-8
- Red
 - primer, 16-11
 - time, effective, 73-20
- Redistribution ring, 34-20
- Redox reaction, 22-7, G-12
- Reduced equation, 10-1
- Reducing agent, 22-7
- Reduction, 22-7, 23-2, G-12
 - area, 43-6
 - degree of, 27-11
 - factor, capacity, 50-5
 - factor, slenderness, 68-7
 - factor, strength, 50-5
 - linear equation, 3-7
 - value, 60-3
 - value, welded connections, 60-4 (tbl)
- Redundancy, 75-10
 - bridge, 74-4
 - degree of, 46-1
 - reliability, 11-9
- Redundant
 - forces, 47-7
 - member, 41-7, 41-13
 - system, 11-9
 - view, 2-2
- Reeving, 83-10
- Reference
 - point stake, 81-1
 - point stake, measurement, 81-1
 - duration, 83-8
 - inertial frame of, 71-10
 - temperature, 85-6
- Reflection cracking, 76-5
- Reflex angle, 6-1
- Reformulated gasoline, 24-7
- Refraction
 - atmospheric, 78-9
 - effect, 78-9 (fig)
- Refractory, G-12
 - ash, 24-3
 - metal, A-116, A-117, A-118
 - organic, 28-6
 - solid, 28-6
 - substance, 29-3
- Refrigeration, ton, 1-7
- Refuse, 24-4
 - derived fuel, 24-4, 31-10, 31-11 (tbl)
- Refutas equation, 14-16
- Regenerating solution, 22-23, 26-18
- Regeneration, 22-23
 - ion exchange, 26-18
- Regime
 - flow, G-6
 - subsonic flow, 14-15 (ftn)
- Region
 - elastic, 43-3, 48-9
 - null, 7-3
 - plastic, 48-9
 - proportional, 43-3
 - Steel, 20-5
 - Steel, rainfall, 20-5
 - strain-hardening, 48-9
 - transition, 16-7
 - void, 7-3
- Registered engineer, 90-1
- Registration, 90-1
- Regression
 - linear, 11-16
 - nonlinear curve, 11-17
- Regula falsi method, 12-2 (ftn)
- Regular
 - function, 8-1
 - lay, 45-22
- Regulation
 - speed, 84-12
 - voltage, 84-11, 84-12
- Regulations, 82-2
 - drinking water, A-96
- Regulator, G-12
 - pressure, 26-25
- Rehabilitation period, 76-20
- Rehbock weir equation, 19-11
- Reid vapor pressure, 32-8
- Reinforced
 - concrete, beam, 50-1
 - concrete pipe, 16-10, 28-3
 - concrete, slab, 51-1
 - membrane, 31-4
- Reinforcement, 69-2
 - beam, 50-2 (fig)
 - beam, minimum, 50-5, 55-4
 - double, 50-24
 - footing, minimum, 55-4
 - horizontal joint, 67-7
 - index, transverse, 55-5
 - joint, 67-7
 - location factor, 55-5
 - ratio, 50-12
 - selection of flexural, 55-4
 - shear, 50-20
 - shear strength, 50-20
 - shear, limitation, 50-22
 - shear, spacing, 50-20, 50-27
 - size factor, 55-5
- Reinforcing
 - bar, 67-6
 - bar, ASTM standard, 48-8 (tbl)
 - bar, masonry, 67-6
 - fabric, 40-10
 - steel, 48-8, 50-2
 - steel, pavement, 77-7
 - wire, A-134
- Related angle, 6-1
 - function of, 6-3
- Relationship flexural-compressive
 - force, 62-2
- Relative
 - abundance, 22-2
 - acceleration, 71-10
 - atomic weight, 22-2
 - compaction, 35-18
 - compaction, suggested, 35-20
 - density, 35-8, 35-17
 - dispersion, 11-13
 - fatigue damage value, 76-20
 - fraction, 87-31
 - importance, 87-31
 - motion, 71-10
 - paddle velocity, 26-11
 - permittivity, 34-9
 - position, 71-10
 - positioning, 78-6
 - proportion, sodium carbonate, 25-11
 - risk, 87-35
 - roughness, 17-5
 - stability, 28-13 (tbl)
 - velocity, 71-10
 - velocity difference, 17-35
- Relaxation
 - loss, 56-4
 - stress, 56-6
- Release valve, air, 16-12
- Reliability, 11-9, 85-2
 - experiment, 11-12
 - flexible pavement, 76-20
 - parallel, 11-9
 - pavement, 76-20
 - serial, 11-9
- Reliable measurement, 85-2
- Relief
 - device, pressure, 16-12
 - drain, 31-7
 - valve, 16-12
 - valve, safety, 16-12
 - well, 21-4
- Reloading curve, 35-24, 43-7
- Reluctance, 85-4 (ftn)
- Rem, G-12
- Remediation, 32-15
- Removal
 - efficiency, 30-13, 34-7
 - efficiency, BOD, 29-9
 - efficiency, ESP, 34-9
 - fraction, 26-6, 30-6

- fraction, BOD, 29-9
 - of barrier, 82-11
 - rate constant, BOD, 29-5
- Renewal, 87-14 (ftn)
- Reovirus, 27-6
- Reoxygenation, 28-7
 - rate constant, 28-7
- Repayment
 - loan, 87-4
- Replacement, 22-7
 - double, 22-7
 - /retirement analysis, 87-4
 - sampling with, 11-3
 - sampling without, 11-3
 - single, 22-7
 - study, 87-18
- Report, environmental impact, 32-3
- Repose, angle of, 40-7, 72-6, 80-4
- Required strength, 50-4
- Research
 - and development cost, 87-33
 - octane number, 24-6
- Reservoir
 - evaporation, 20-22
 - impounding, 20-19
 - multiple, 17-22
 - routing, 20-21
 - sizing, 20-19
 - three, 17-22
 - yield, 20-19
- Residence time
 - mean, 29-7
 - mean cell, 30-5, 30-8
 - particle, 34-8, 34-9
 - solids, 30-5
- Residential property, 87-20 (ftn)
- Residual, 30-2, G-12
 - available combined, 28-13
 - chlorine, total, 34-8
 - combined, 25-9, G-4
 - free, 25-9, G-6
 - fuel oil, 24-6
 - oxidant, total, 29-13
 - unavailable combined, 28-13
 - value, 86-7, 87-16
- Resilience, 43-7
 - modulus of, 43-7
- Resilient
 - material, 43-7
 - modulus, 76-20, G-12
 - modulus, effective roadbed soil, 76-20
 - modulus estimation chart, 76-21 (fig)
- Resin
 - gelular, 26-17
 - ion exchange, 22-22
 - macroporous, 26-17
 - macroreticular, 26-17
- Resistance (*see also type*)
 - air, 75-3
 - baghouse, 34-5
 - curve, 75-3, 75-5
 - electrical, 84-2
 - electrical, bridge, 85-9
 - electrical, motion, 14-2
 - electrical, shear, 14-1
 - electrical, temperature detector, 85-5
 - electrical, thermal, coefficient, 85-6 (tbl)
 - electrical, rolling, 72-8
 - factor, 74-4
 - factor for joint, AASHTO, 56-7 (tbl)
 - factor, AASHTO, 56-7
 - fatigue, pavement, 76-4
 - filter, 34-5
 - flow, 34-5
 - grade, 75-2
 - incidental, 75-5
 - inertia, 75-2
 - knock, 24-6
 - level tangent, 75-5
 - locomotive, 75-4
 - nominal, 74-4
 - pile, 38-2
 - railroad car, 75-4
 - rolling, 75-2 (ftn)
 - side, 38-3
 - skid, pavement, 76-3, 76-4
 - skin, 38-3
 - slip, 65-3
 - specific, 34-5, 34-6
 - temperature detector, 85-5
 - thermometer, 85-5
 - tip, 38-2
 - value, Hveem's, 35-31
 - value, soil, 35-32, 76-20
 - vehicular, 75-2
- Resisting
 - moment, 44-8 (ftn)
 - shear, 44-8 (ftn)
- Resistivity
 - electrical, 84-2, 85-6
 - fire, 82-4
 - particle, 34-9
- Resistor, 84-2, 84-3, 84-5
 - variable, 85-3
- Resolution, 3-6
 - of frequency analysis, 9-8
- Resonant cycle length, 73-16
- Resource
 - leveling, 86-10
 - recovery plant, 31-10
- Respirable fraction, 32-7
- Respiration, G-12
- Respiratory quotient, 27-11
- Response
 - dynamic, 44-8
 - static, 44-8
- Restitution, coefficient of, 72-17
- Restraint, G-12
- Result
 - highly significant, 11-14
 - Kutta-Joukowski, 17-41
 - significant, 11-14
- Resultant
 - acceleration, 71-8, 71-14
 - force, equivalent, 41-4
 - force-couple system, 41-4
 - shear, 45-17
 - total active, 37-3
 - vector, 5-2, 5-3
- Resurfacing, G-12
- Retainer fee, 88-5
- Retaining wall, 54-1, 54-2
 - active component, A-108, A-109
 - analysis, 37-9
 - cantilever, 37-1
 - design, 37-12
 - key, 37-1
 - water table, 37-9
- Retardance roughness coefficient, Manning's, 20-4
- Retarded flow, G-12
- Retarder
 - concrete, 49-8
 - set, 48-3
- Retention (*see also type*) (*see also Detention*)
 - period, 29-7
 - specific, 21-3, 21-4
 - surface, G-14
 - time, 26-6, 29-7
 - time, hydraulic, 30-7
 - watershed, 20-19
- Retentivity, 34-3
- Reticulum, endoplasmic, 27-2
- Retirement analysis, 87-4
- Retrograde solubility, G-12
- Retroreflector, 78-9
- Return
 - external rate of, 87-12
 - internal rate of, 87-12
 - interval, 20-5
 - minimum attractive rate of, 87-16
 - on investment, 87-36
 - on investment ratio, 87-11, 87-14
 - rate of, 87-4, 87-12, 87-14
 - rate, sludge, 30-10
- Reuse
 - beneficial, 30-20
 - wastewater, 29-12
- Revenue, 87-34
- Reverse
 - bias, 85-5 (ftn)
 - osmosis, 26-22
- Reversed effective force, 72-5 (ftn)
- Reversible
 - reaction, 22-13, 22-14
 - reaction kinetics, 22-14
- Revolution
 - solid of, 9-6
 - surface of, 9-5, 42-3 (fig)
 - volume of, 9-5, 9-6, 42-3 (fig)
- Reynolds number, 1-9 (tbl), 16-7
 - critical, 16-7
 - factor, 17-14
 - mixing, 26-11
 - similarity, 17-6
- Rheogram, 14-7
- Rheopectic fluid, 14-7
- Rheostat, 84-2
- Ribonucleic acid (RNA), 27-2
- Right
 - angle, 6-1
 - circular cone, formula, A-9
 - circular cylinder, A-9
 - distributive law, 4-4
 - hand rule, 5-4, 41-3 (fig)
 - of access, G-12
 - triangle, 6-2
- Righting moment, 15-18
- Rigid
 - body, 71-1, 72-10
 - body motion, 72-2
 - diaphragm, 68-12
 - framing connection, 65-7
 - pavement, 77-1, G-12
 - pavement design, 77-5
 - pavement nomograph, AASHTO, 77-8 (fig)
 - pavement, axle load equivalency factor, A-170
 - pavement, equivalency factor, A-169, A-171
 - truss, 41-12
- Rigidity, 44-2, 44-3
 - flexural, 44-3
 - modulus, 43-8
- Ring
 - benzene, 23-1 (tbl)
 - double, infiltration test, 21-9
 - permutation, 11-2
 - piezometer, 15-2 (ftn)
 - redistribution, 34-20
 - slip, 85-8 (ftn)
 - stiffness, 16-11
- Ringelmann scale, 24-12
- Rip rap, G-12
- Rippl diagram, 20-21
- Rise in temperature, 13-4
- Riser pipe, 21-4
- Rising
 - limb, 20-7
 - sludge, 30-12
- Risk, 11-14
 - alpha, 11-14
 - analysis, 87-44
 - beta, 11-15
 - consumer, 11-15
 - free investment, 87-11
 - mitigation, geotechnical, 35-33
 - producer, 11-14
- Rivet, 45-10, 65-1
- RMR system, 35-33
- rms value, 84-4, 84-5
- RNA, 27-2
- Road (*see also Roadway*)
 - access charge, 73-27

- adhesion, coefficient of, 75-5
 collector, 73-3
 frontage, G-7
 local, 73-3
 message cue, 75-9
 mix, G-12
 safety feature, 75-12
 Test, AASHO, 77-5
 user cost, 73-27
- Roadbed, G-12
 soil resilient modulus chart, 76-21 (fig)
- Roadside safety railing, 75-13
- Roadway, 75-15
 banking, 72-8
 functional classification, 73-3 (tbl)
 network element, 75-15
 network warrant, signalization, 73-19
 or environmental factor, 75-8
 segment (*see also* Segment), 75-10
 urban, 73-3
- Rock, 35-2
 bearing capacity, 36-8
 excavation, 80-2
 igneous, 35-32
 mass rating system, 35-33
 metamorphic, 35-32
 quality designation, 35-32
 salt, 35-32
 type, 35-32
- Rocket, 72-19
- Rockwell
 A scale, 43-13
 B scale, 43-13
 C scale, 43-13
 hardness test, 43-13
- Rod
 grade, 81-4, 81-5 (fig)
 ground, 81-4, 81-5 (fig)
 leveling, 78-10
 person, 81-4
 Philadelphia, 78-10
 precise, 78-10
 reading, 81-4
 reading for grade, 81-4
 slider, 71-14
 standard, 78-10
 tie, 39-5
 waving the, G-15
- Roentgen, G-12
- Rohsenow equation, 14-11
- Roll, 15-18 (ftn), 72-2
- Rollcrete, 48-7
- Roller
 -compacted concrete, 48-7, 76-29
 grid, 35-18
 pavement (*see also type*), 76-8
 pneumatic, 76-8
 rubber-tired, 35-18, 76-8
 sheepsfoot, 35-18
 smooth-wheeled, 35-18
 static, 76-8
 support, 41-7
- Rolling
 equipment, 76-8
 friction, coefficient of, 72-8
 resistance, 72-8, 75-2 (ftn)
 resistance, coefficient of, 72-8
 resistance, wheel, 72-8 (fig)
 stock, railroad, 75-4
- Root, 3-3, 12-1
 -mean-squared value, 11-12, 84-4, 84-5
 double, 3-3
 extraneous, 3-4
 finding, 12-1
 pile, 38-6
- Rope, 41-11
 -operated machine, mechanical
 advantage, 41-11 (tbl)
 haulage, 45-21
 hoisting, extra flexible, 45-21
 standard hoisting, 83-10
 structural, 45-21
 transmission, 45-21
 wire, 45-21, 45-22
- Rosette strain gauge, 85-8
- Rotameter, 17-27
- Rotary
 action pump, 18-2, 18-3
 bridge, 73-25
 pump, slip, 18-3 (fig)
- Rotating
 beam test, 43-9 (fig)
 biological contactor, 29-11
 biological contactor,
 characteristics, 29-12
 biological reactor, 29-11
 machine, electrical, 84-11
- Rotation, 44-19, 71-7
 axis of, 72-2
 center of, 66-7
 fixed axis, 72-2
 method, instantaneous center of, 65-6
 of axis, 42-7
 pipe bundle, 34-16, 34-17 (fig)
 point of, 79-8
 point of, bulkhead, 39-4
- Rotational
 particle motion, 71-7
 symmetry, 7-4
- Rotavirus, 27-6
- Rotex gear, 83-9, 83-10
- Rotifer, 27-8
- Rotor
 concentrator, 34-4
 motor, 84-14
- Rough-pipe flow, 17-5
- Roughing filter, 29-9
- Roughness
 coefficient, 17-8, A-73
 coefficient, Manning's, 19-4, A-73
 coefficient, overland, 20-4
 coefficient, retardance, 20-4
 height, 2-4
 height index, 2-4
 relative, 17-5
 sampling length, 2-4
 specific, 17-5 (tbl), A-50
 weight, 2-4
 width, 2-4
 width cutoff, 2-4
- Round beam, 50-1
- Rounding
 begin slope, 81-4
 end slope, 81-4
- Route surveying, 78-9
- Routing
 channel, 20-23
 flood, 20-23
 reservoir, 20-21
- Row
 canonical form, 4-2
 equivalent, 4-2
 equivalent matrix, 4-2
 matrix, 4-1
 operation, elementary, 4-2
 rank, 4-5 (ftn)
 -reduced echelon form, 4-2
 -reduced echelon matrix, 4-1
- RQD, 35-32
- Rth-order difference, 3-10
- Rubber
 asphalt, 76-29
 crumb, asphalt, 76-29
 -modified asphalt, 76-29
 -tired roller, 35-18, 76-8
- Rubberized asphalt process, 76-29
- Rubbish, 24-4
- Rubcrete, 77-13
- Rule, 89-1
 80%, 84-9
 compass, 78-15
 Cramer's, 3-7, 4-7
 derived, 32-2
 engineering economic analysis, 87-3
 half-year, 87-3
 L'Hôpital's, 3-9
 mixture, 32-2
 of 72, 87-8
 of 90s, 76-3
 of professional conduct, 89-1
 of signs, Descartes', 3-4
 right-hand, 5-4, 41-3 (fig)
 SI system, 1-5
 Simpson's, 7-2, 78-18
 six nines, 34-13
 statutory, 89-1
 transit, 78-15
 trapezoidal, 7-1, 78-17
- Ruling gradient, railroad, 75-4
- Run
 -of-mine coal, 24-4
 -of-the-nut method, 45-13
- Runaway speed, 17-36
- Runner, turbine, 18-21
- Running
 bond, 67-3
 speed, 73-3
 speed, average, 73-3
- Runoff, 32-14
 C-coefficient, A-81
 condition, antecedent, 20-17
 crown, 79-8
 curve number, 20-18, 20-19
 peak, 20-11
 subsurface, G-14
 superelevation, 79-8
 surface, 20-7 (ftn), G-14
 tangent, 79-8
- Runout, tangent, 79-8
- Runway, airport, 73-30, 79-21
- Rupture
 angle of, 43-8
 line, 35-26
 modulus of, 50-16, 77-6
 modulus of, concrete, 48-6
 Mohr's theory of, 43-8
 strength, 43-16
- Rural
 area, 73-3
 survey, 78-5
- Rutting, pavement, 76-5
- RV equivalent, 73-7
- Ryznar stability index, 26-18
- S**
- S
 corporation, 88-3
 -curve, 27-4
 -curve method, 20-13
 -test, 35-28
- S-N curve, 43-9
 typical, aluminum, 43-10 (fig)
 typical, steel, 43-9 (fig)
- Sack, cement, 48-1
- Sacrificial anode, 22-19
- Saddle point, 7-2
- Safe
 bearing pressure, 36-2
 bearing value, pile, 38-2
 Drinking Water Act, 25-5
 load, pile, 38-2
 yield, 21-6, G-12
- Safety, 83-1
 crane, 83-10
 electrical, 83-6 (tbl), 83-7 (tbl)
 feature, road, 75-12
 geotechnical, 35-33
 highway, 75-2
 management technique, 75-10
 objective, 75-2
 performance function, 75-16
 railing, roadside, 75-13
 relief valve, 16-12
 scaffolding, 83-9
 subjective, 75-2

valve, 16-12
 valve, full-lift, 16-12
 valve, high-lift, 16-12
 valve, low-lift, 16-12
Sag
 curve, 28-10, 79-11, 79-14, 79-15, 79-16
 curve, oxygen, 28-11 (fig)
 oxygen, 28-10
 pipe, G-12
Salary plus fee, 88-5
Saline, G-12
Salinity, 22-10
 hazard, 25-11
 irrigation water, 25-11
Salometer scale, 14-5 (ftn)
Salt, G-12
 crevice, 22-24
 water conversion, 26-22
Salvage value, 87-18
Sample, 11-3
 grab, 28-15
 space, event, 11-3
 standard deviation, 11-13 (ftn)
 variance, 11-13
Sampler, split-spoon, 35-16
Sampling, 11-2
 with replacement, 11-3
 without replacement, 11-3
Sand, G-12
 bearing capacity, 36-7
 braced cut, 39-2
 cohesion, 35-27
 cuts in, 39-2 (fig)
 drying bed, 30-18
 filter, 26-13, 29-12
 filter bed, 32-14
 filter, intermittent, 29-12
 filter, polishing, 29-12
 filter, rapid, 26-13, 29-12
 filter, slow, 26-14, 29-12
 -lightweight concrete, 48-7
 quick, 36-2
 raft on, 36-11
 stability, cut, 39-4
 trap, G-12
 versus clay, 36-1, 36-2
Sandstone, 35-32
Sanitary wastewater, 28-1
Saturated
 density, 35-7
 hydrocarbon, 23-2 (tbl), 24-1
 solution, 22-11
 steam, properties, A-60, A-61, A-62
 steam, properties, A-67, A-68, A-69
 surface-dry condition, 49-3
Saturation
 coefficient, 67-5
 coefficient, oxygen, 30-9
 concentration (gas in liquid), 22-9
 concentrations of dissolved oxygen in
 water, A-87
 degree of, 35-7, 73-15
 flow rate, 73-15
 flow ratio, 73-15
 index, Langelier, 26-18
 pressure, 14-9
SAW process, 66-1
Saybolt
 Seconds Furol (SSF), 14-6
 Seconds Universal (SSU), 14-6, 18-2 (ftn)
 viscometer, 14-6 (ftn)
SBC, 82-1
Scaffold, 83-9
Scalar, 5-1
 matrix, 4-1
 multiplication, 4-4
 product, triple, 5-5
Scale, 22-21 (ftn), 26-18, 78-18
 API, 14-5
 Baumé, 14-5
 characteristic, 19-18
 length, 19-18

map, 78-21
 model, 17-45
 Mohs, 43-13
 parameter, 11-8
 Ringelmann, 24-12
 Rockwell A, 43-13
 Rockwell B, 43-13
 Rockwell C, 43-13
 spring, 45-20, 85-14
 water, 25-4
Scaling
 constant, 34-6 (tbl)
 index, Puckorius, 26-19
 law, 18-20
 pavement, 76-5
Scavenging, oxygen, 22-23
SCFM, 30-9
Schedule
 -40 pipe, 16-9, 16-10, 16-10 (ftn)
 management, 86-9
Scheduling
 fast-track, 86-9
 project, 86-8
Schist, 35-32
Schmidt number, 1-9 (tbl)
Schmutzdecke, 26-14 (ftn)
School crossing warrant, signalization,
 73-18
Schulze correlation, 29-11
Scleroscopic hardness test, 43-14
Score, cut, -xxxii
Scour, G-12
 protection, 19-13, 19-14
 velocity, 29-6
Scratch hardness test, 43-13
Screed (see also type), 76-7
 extending, 76-7
 high-density, 76-7
Screen
 gravel, 21-5
 wastewater, 29-6
 well, 21-4
Screening, 26-2
 pea coal, 24-4
 transportation network, 75-17
Screwed fitting, 17-12 (ftn)
Scrim, 31-4, G-12
Scrubber, 34-2
 atomizing, 34-18
 venturi, 34-18
 wet, 34-2
 wet venturi, 34-18 (fig)
Scrubbing, 34-17
 advanced, 24-5
 chemical, 34-17
 dry, 34-17
 semi-dry, 34-17
 venturi, 34-18
SCS
 curve number, 20-16
 graphical method, 20-17
 lag equation, 20-11
 peak discharge, 20-17
 synthetic unit hydrograph, 20-11
Scum, 29-7
 grinding, 29-7
SDG sewer, 28-4
Seal, 34-16
 coat, G-12
 double, 34-16
 mechanical, 34-16
 single, 34-16
 tandem, 34-16
Sealer, penetrating, 77-12
Sealing surface, 77-12
Seamless steel boiler tubing,
 dimensions, A-49
Search, visual, 75-9
Seasonal variation, 38-3
Secant
 bulk modulus, 14-14
 formula, 45-4

hyperbolic, 6-5
 method, 12-2 (ftn)
 modulus, 43-4
 modulus of elasticity, concrete, 48-5
Second
 area moment, 42-4
 derivative, 8-1
 law of cosines, 6-6
 moment of a function, 9-6
 moment of the area, 42-4
 stage demand, G-12
Secondary
 clarifier, 29-12
 combustion chamber, 34-13
 compression index, 40-6
 consolidation, 40-3, 40-5
 consolidation, coefficient of, 40-6
 creep, 43-16
 -order analysis, 47-16
 -order analysis, linear, 47-2
 -order analysis, nonlinear, 53-1
 -order differential equation, 10-1
 -order effect, 62-1, 62-2
 -order homogeneous, 10-3
 -order linear, 10-3
 treatment, 29-3
Section (see also type), 2-4, 78-20
 built-up, 63-1
 compact, 59-2, 61-6
 compression-controlled, 50-5
 conic, 7-8, 7-9
 critical, base plate, 61-10
 cross, 2-4 (ftn), 80-2
 dangerous, 44-11
 drawing, 2-3
 factor, 19-3
 hollow structural, 58-3
 modulus, 42-7, 44-11, 59-3
 modulus, elastic, 59-3
 modulus, plastic, 59-8, 59-11
 modulus, plastic, plate girder, 63-2
 noncompact, 61-6
 slender element, 61-6
 structural, G-13
 tension-controlled, 50-5
 transition, 50-5
 typical, 80-3
Sectioning cut, 2-4
Sections
 method of, 41-15
 taking at pluses, 80-3
Sector, A-7
Sediment structure, 80-11
Sedimentary rock, 35-32, G-12
Sedimentation, 20-23, 26-3
 basin, characteristics, 29-7
 basin, plain, 29-7
 efficiency, 26-6
 plain, 26-5
 tank, 26-5
Seebeck effect, 85-7
Seed, G-12, G-13
Seeded BOD, 28-10
Seeding, 80-11
Seep, G-13
Seepage
 flow net, 21-8
 velocity, 21-4
Segment
 asymmetrical, cable, 41-20 (fig)
 crash factor, 75-10
 length, weaving, 73-26
 major weave, 73-26
 normally consolidated, 40-4
 one-sided weaving, 73-26
 roadway, 75-15
 two-sided weaving, 73-26
Segmental construction, bridge, 56-7
Segregation concrete, 49-5
Seiche
 external, G-13
 internal, G-13

- Seismic
 design category, 69-3
 design category, masonry, 68-2, 68-13
 load, 50-20
 response modification factor, masonry,
 68-3, 68-12, 68-14
- Selective
 catalytic reduction, 32-10, 34-19
 leaching, 22-19
 noncatalytic reduction, 34-19
- Selenide, cadmium, 85-5
- Self
 -cleansing pipe, 20-3 (ftn)
 -cleansing velocity, 19-2, 20-3 (ftn), 28-4
 -compactible concrete, 48-7
 -consolidating concrete, 48-7
 -placing concrete, 48-7
 -purification, 28-10
 -purification constant, 28-11
- Selling expense, 87-33
- Semi
 -dry scrubbing, 34-17
 -gravity wall, 37-1
 -precise level, 78-10
 -rigid framing connection, 65-7
 -variable cost, 87-32
- Semimajor distance, 7-11
- Seminor distance, 7-11
- Semipermeable membrane, 14-10
- Sending unit, 85-3 (ftn)
- Sense, 5-1
- Sensitivity, 11-12, 85-2, G-13
 analysis, 87-44
 clay, 35-29
 contrast, 75-9
 factor, strain, 85-8
 fatigue notch, 43-10
 type, 87-44 (fig)
 variable, 87-44
- Sensor, 85-3
- Separable first-order, 10-2, 10-3
- Separate system, G-13
- Separation
 factor, 34-8
 hydrograph, 20-7
 of terms, 9-3
- Separator, inertial, 32-7, 34-7
- Septage, 29-2
- Septic, G-13
 tank, 29-2
- Sequence, 3-10
 arithmetic, 3-11
 convergent, 3-10
 divergent, 3-10
 geometric, 3-11
 harmonic, 3-11
 p -, 3-11
 standard, 3-11
- Sequencing
 batch reactor, 30-4
 construction, 86-8
 design, 86-8
- Sequentiality, 75-10
- Sequestering agent, 26-19 (ftn)
- Serial
 reliability, 11-9
 system, 11-9
- Series, 3-11
 arithmetic, 3-12
 circuit, electrical, 84-3
 expansion, 8-8
 finite, 3-11
 Fourier, 9-7
 galvanic, 22-19 (tbl)
 geometric, 3-12
 harmonic, 3-12
 hydrocarbon, 24-1
 infinite, 3-11, 87-7
 Maclaurin, 8-8
 methane, 24-1
 naphthalene, 24-1
 of alternating sign, 3-13
 olefin, 24-1
 paraffin, 24-1
 perpetual, 87-7
 pipe, 17-20
 power, 8-8
 pumps in, 18-18
 spring, 45-20
 Taylor's, 8-8
- Server queue, 73-28
- Service
 factor, 72-7 (ftn), 84-13
 factor, motor, 18-10
 flow rate, 73-5, 73-10
 level of, 73-3, 73-8, 73-21
 life, 87-20
 limit state, 56-7, 74-4 (ftn)
 load, 45-2, 50-3
 pressure, 26-25
 time, 73-27
- Serviceability, 59-5
 beam, 50-14
 cracking, 50-14
 deflection, 50-15
 index, initial, 76-20
 index, terminal, 76-17, 76-20
 limit states, 58-5
- Set, 11-1
 accelerator, 48-3
 associative law, 11-2
 commutative law, 11-2
 complement, 11-1
 complement law, 11-1, 11-2
 de Morgan's law, 11-2
 disjoint, 11-1
 distributive law, 11-2
 element, 11-1
 idempotent law, 11-1
 identity law, 11-1
 intersection, 11-1
 laws, 11-1
 member, 11-1
 null, 11-1
 permanent, 43-3, 48-9
 point, 22-23, 26-18
 retarder, 48-3
 union, 11-1
 universal, 11-1
- Setting, 18-24
- Settleable
 solid, 34-23
 solids, 25-9
- Settled sludge volume, 30-6
- Settlement (*see also*
 Consolidation), 36-1, 40-3
 differential, 36-1
 elastic, 40-3
 immediate, 40-3
 pile, 38-5
- Settling, 40-3
 basin, G-13
 column test, laboratory, 26-6
 rate, 29-7
 velocity, 17-43, 26-5, 26-6
 velocity, critical, 26-7
- Severability, 88-4
- Severity
 category, 75-11
 crash, 75-16
 rate, 83-2
 ratio, 75-11
- Sewage
 pump, 18-4
 punching, 55-3
 strength, 28-8
- Sewer
 alternative, 28-4
 branch, G-3
 capacity, 28-5 (tbl)
 collector, 28-2
 combined, 28-2
 G-P, 28-4
 gravity, 28-4
 interceptor, 28-3
 main, 28-2
 minimum velocity, 19-2
 overflow, combined, 29-13
 pipe, concrete dimensions, A-42, A-43
 pipe, dimensions and weights, A-42, A-43
 pipe, material, 28-3
 pipe, PVC dimensions, A-39, A-40, A-41
 size, 28-4
 slope, 28-4
 small-diameter, gravity, 28-4
 surcharged, G-14
 trunk, 28-2
 velocity, 28-4
- Sexagesimal system, 78-7
- Shadow vehicle, 73-32
- Shaft, 45-7
 capacity, 38-3
 critical speed, 26-12
 design, 45-14
 loading, pump, 18-11
 pier, G-11
 twist, 43-8, 45-14
- Shale, 35-32
- Shallow foundation, 36-1
- Shape
 basic, 42-1, 42-4
 designation, 58-3 (tbl), 60-1
 designation, compression member cross
 section, 61-2 (fig)
 factor, 35-23, 36-3
 mensuration, A-7
 most economical, 58-6
 of a fluid, 14-1
 pile, 80-4 (fig)
- Sharp-crested weir, 19-11
- Sharpest curve, 79-8
- Shear, 44-8
 ACI coefficient, 47-19
 beam load cell, 85-13
 cantilever wall, 39-5 (fig)
 capacity, vertical stirrup, 50-22 (fig)
 center, 45-17, 59-15
 center, thin-wall section, 45-17 (fig)
 coefficient, ACI, 47-19
 connection, 65-4
 connector, 57-2, 64-1, 64-4
 crack, typical pattern, 50-20 (fig)
 critical section, one-way, 55-3 (fig)
 critical section, two-way, 55-3 (fig)
 critical section, wall footing, 55-2 (fig)
 diagram, 44-8
 direct, 66-6
 double-action, 55-3
 envelope, 50-20
 envelope, maximum, 47-20
 failure, soil, 36-2
 flow, 45-16
 force of action, 45-17
 formation, rate of, 14-6, 14-7
 horizontal, 44-10
 lag, 57-3
 lag reduction coefficient, 60-3
 lag reduction coefficient, bolted
 connection, 60-3 (tbl)
 lag reduction coefficient, welded
 connection, 60-4 (tbl)
 minimum, 46-10
 modulus, 43-8 (tbl), 44-2, 45-14, 58-2
 modulus of elasticity, 43-8
 one-way, 44-8 (ftn), 55-3
 panel, 46-12
 prestressed section, 56-11
 punching, 55-3
 rate, 14-6, 17-14
 reinforcement, 50-20
 reinforcement, anchorage, 50-23
 reinforcement, anchorage requirement,
 50-23 (fig)
 reinforcement design procedure, 50-23
 reinforcement limitation, 50-22
 resistance, 14-1
 resisting, 44-8 (ftn)

- resultant, 45-17
- single-action, 55-3
- slab design, 51-3
- span, 50-27
- strain, 43-8
- strength, 43-8, 59-5, 63-2
- strength, block, 60-4
- strength, concrete, 48-6
- strength, nominal, 50-21
- strength, nominal, concrete, 50-21
- strength, shear reinforcement, 50-21
- stress, 44-2
- stress, beam, 44-10
- stress, concrete beam, 50-20
- stress, fluid, 14-6, 17-14
- stress, rectangular beam, 44-11 (fig)
- stud connector, 64-3
- stud, material, 58-4
- test, direct, 35-25
- torsional, 66-6
- two-way, 55-3
- ultimate, 59-12
- vane test, 83-3
- wall, 54-2
- wide-beam, 55-3
- Sheave, 41-11
- wire rope, 45-22
- Sheepsfoot roller, 35-18
- Sheet
 - flow, 20-3
 - flow, Manning's roughness coefficient, 20-3
 - piling, 39-4
 - piling, allowable stress, 39-4 (tbl)
 - piling, section modulus, 39-4
- Sheeted pit, G-13
- Sheeting, close-, 39-1
- Shells
 - method of, 9-6
 - torsion, 45-15
- Sherwood number, 1-9 (tbl)
- Shield
 - arc, 64-4
 - configuration, 83-4 (fig)
 - trench, 83-3
- Shielded metal arc weld, 66-1
- Shifting taper, 73-32
- Shock
 - electrical, 83-6, 83-7
 - load, septage, 29-2
 - treatment, 28-5
- Shooting flow, G-13
- Shore hardness test, 43-14
- Shored construction, 57-3
- Shoring, 64-2, 83-3
 - box-, 39-1
 - skeleton, 39-1
- Short
 - circuit, electrical, 84-2
 - circuited, 26-12
 - column, 52-1
 - hydraulically, 19-27
 - length, weaving, 73-26
 - term transaction, 87-3
 - ton, 1-7
- Shortt equation, 79-18
- Shotcrete, 40-10
- Shoulder taper, 73-32
- Shovel, 80-9
- Shoving pavement, 76-5
- Shredder, 29-7
- Shrink fit, 45-6
- Shrinkage, 56-3, 80-1, 80-9
 - cement, -compensating, 48-2
 - compensating concrete, 48-2
 - cracking, 48-2
 - index, 35-22
 - limit, 35-21
 - loss, 56-4
 - pretension loss, 56-3
- Shunt balance bridge, 85-9 (ftn)
- Shutoff
 - point, pump, 18-16
 - service valve, 16-12
- SI
 - base unit, 1-5 (tbl)
 - conversion factor, A-3
 - derived unit, 1-6
 - prefix, 1-7
 - system rule, 1-5
 - unit, 1-5
- Sick building syndrome, 32-4
- Side
 - friction factor, 38-3, 72-8, 79-7
 - resistance, 38-3
 - slope, erodible channel, 19-26
 - water depth, 29-7
- Sidesway, 47-15
- Sideways friction, 72-8, 79-7
- Siemens, 84-2
- Sieve
 - opening, 35-2
 - size, 35-3
 - test, 35-2
- Sight distance, 79-14, 79-15, G-13
 - decision, 79-11, G-5
 - headlight, 79-16
 - non-stripping, G-10
 - passing, 79-10, G-11
 - stopping, 79-10, G-13
- Sightline offset, horizontal, 79-11
- Sigma chart, 11-16
- Sigmoidal shape, 27-4
- Sign
 - alternating, series of, 3-13
 - convention, 44-5 (fig)
 - of the function, 6-3
- Signal
 - analyzer, 9-8
 - coordination warrant, signalization, 73-18
 - four-phase, 73-14
 - phase, 73-15
 - three-phase, 73-14
 - timing, Greenshields method, 73-17
 - timing, Webster's equation, 73-16
 - two-phase, 73-14
 - versus stop sign, 73-18
 - warrant, 73-17
- Signalized intersection, 73-14
- Signature analysis, 9-8 (ftn)
- Significance level, 11-14
- Significant
 - digit, 3-1
 - result, 11-14
 - result, highly, 11-14
- Silica fume, 48-2
- Siliceous-gel zeolite, 22-22
- Silt fence, 80-11
- Silver point, 85-6 (ftn)
- Silviculture, 30-20
- Similar triangle, 6-2
- Similarity, 17-45
 - dynamic, 17-45
 - geometric, 17-45
 - law, pump, 18-20
 - mechanical, 17-45
 - partial, 17-47
- Simple
 - framing connection, 65-6 (fig)
 - interest, 87-11, 87-40
 - interest loan, 87-40
 - pipe culvert, 17-19 (fig)
 - ranking method, 75-17
 - support, 41-7
- Simplex pump, 18-2
- Simplified curve formula, 79-7
- Simply supported, 41-7
- Simpson's rule, 7-2, 78-18
- Simulated equilibrium, 72-5 (ftn)
- Simulation
 - Monte Carlo, 20-22, 87-42 (ftn)
 - reservoir, 20-22
 - stochastic, 20-22
- Simultaneous equations
 - linear, 3-6, 3-7
 - matrix, 4-6
 - solving, 3-7
- Sine
 - covered, 6-4
 - flipped, 6-4
 - function, integral, 9-8
 - hyperbolic, 6-4
 - law of, 6-5, 6-6
 - versed, 6-4
- Single
 - suction pump, 18-4
 - acting hammer, 38-2
 - acting pump, 18-2
 - action shear, 55-3
 - angle, 61-1
 - butt, 45-11 (ftn)
 - cyclone, 34-7
 - cyclone, double-vortex (inertial separator), 34-7 (fig)
 - drainage, 40-5
 - payment cash flow, 87-3
 - payment present worth factor, 87-5
 - point calibration, 85-2
 - point diamond interchange, 73-25
 - point urban interchange (SPUI), 73-25
 - proprietorship, 88-1
 - seal, 34-16
 - shear, 45-11
 - stage pump, 18-4
 - strength test, 49-1
- Singular
 - matrix, 4-2, 4-5
 - point, 8-1, 8-3 (ftn)
- Singularity, 4-5
- Sink energy, 17-15
- Sinkhole, G-13
- Sinking fund, 87-7
 - factor, 87-7
 - method, 87-22
- Sinuosity, G-13
- Siphon, 17-20
 - air valve, 16-14
 - inverted, G-8
- Site
 - condition, crash, 75-18
 - condition, transportation, 75-15
 - development cost, 86-4
 - dewatering, 80-11
 - transportation network, 75-15
 - visit, 86-3
- Siting
 - landfill, 31-5
 - wastewater treatment plant, 29-3
- Six
 - nines rule, 34-13
 - sack mix, 49-2
- Size
 - cut, 34-8
 - distribution, particle, 35-2
 - dust, convention, 32-7
 - effective grain, 35-2
 - effective throat, 45-14
 - factor, 55-5
 - motor, 18-10
 - sieve, 35-3
 - weld, 66-3
- Skeleton shoring, 39-1
- SK rating, 29-8
- Skempton bearing capacity
 - factors, 39-3 (tbl)
- Skew, symmetric matrix, 4-2
- Skewness, 11-14
 - Fisher's, 11-14
 - Pearson's, 11-14
- Skid resistance, pavement, 76-3
- Skidding
 - distance, 75-7
 - friction, coefficient of, 75-6 (tbl)

- Skimming tank, 29-7
- Skin
friction, 17-5 (ftn), 17-41
friction capacity, 38-3
friction coefficient, 17-5 (ftn),
17-45 (ftn), 38-3
friction loss, 17-4 (ftn)
friction, negative, 38-6
resistance, 38-3
- Slab
beam, factored moment, 51-6
-beam floor system, 50-3 (fig)
beam, two-way, 51-7 (fig)
concrete, 51-1
concrete, effective width, 64-2
deck, 51-8
deflection, 51-2
design, flexure, 51-3
design, shear, 51-3
flat, 51-5
length, pavement, 77-7
minimum thickness, 51-2 (tbl), 51-8 (tbl)
one-way, 51-2 (fig)
reinforced concrete, 51-1
two-way, 51-5 (fig)
waffle, 51-5
width, effective, composite member, 57-2
- Slack time, 86-11
- Slag, 24-3
- Slaked lime, 26-15
- Slam-bang, 80-9
- Slate, 35-32
- Slender
column, 45-2
element section, 61-6
- Slenderness, 69-2
ratio, 45-3, 52-1, 61-2
ratio, critical, 61-4
ratio, steel tension member, 60-4
reduction factor, 68-7
- Slewing
platform, 83-9, 83-10
unit, 83-9, 83-10
- Slickenside, G-13
- Slider
rod, 71-14
rod assembly, 71-14
- Sliding, 72-11
factor of safety, 15-12
plate viscometer test, 14-6
vector, 5-1 (ftn)
window method, 75-17
- Slip, 18-10
ammonia, 34-19 (ftn)
base, pole, 75-13
coefficient, 65-3
-critical connection, 65-3
electrical, 84-14
factor, Cunningham, 34-9
-form construction, 77-1, 77-2
forming, 49-7
pump, 18-3
resistance, 65-3
ring, 85-8 (ftn)
- Sliplining, 40-11
- Slipping, 72-11
cracking, pavement, 76-5
- Slope, 7-5, 8-1, 19-15, G-13
backfill, broken, 37-6
circle failure, 40-7
configuration, 83-4 (fig)
critical, 19-3, G-5
cross, adverse, 79-8
deflection method, 47-3
drain, temporary, 80-10
energy gradient, 19-3
excavation, 83-3
geometric, 19-3
-intercept form, 7-5
maximum allowable, 83-4 (tbl)
normal, 19-3
/ramp method, landfill, 31-2
rounding, begin, 81-4
rounding, end, 81-4
sewer, 28-4
stability chart, 40-7
stability, clay, 40-7
stability, Taylor, 40-7 (fig)
stability, Taylor chart, 40-7
stake, 81-1, 81-3
stake, marking determinant, 81-4
- Sloping excavation, 83-3
- Slot weld, 66-2
- Slotted hole, 65-1
- Slow
-closing valve, 17-39
cure, asphalt, 76-2
sand filter, 26-14, 29-12
test, 35-28
- Sludge, 26-12, 30-2, 32-2 (ftn), G-13
activated, 30-2
age, 30-5
age, BOD, 30-5
beneficial reuse program, 30-20
bulking, 30-5, 30-12, G-13
cake, 30-18
characteristics, 30-13
composting, 30-20
conditioner, 22-24
critical velocity, 18-5, 18-6
dewatering, 30-18
disposal, 30-20
incineration, 30-20, 34-15
landfill, 30-20
methane production, 30-16
monofill, 30-20
ocean dumping, 30-20
parameters, 30-4
pump, 18-5
pump power factor, 18-5
quantity, wastewater, 30-13
quantity, water treatment, 26-12
recycle rate, 30-11
return rate, 30-10
rising, 30-12
stabilization, 30-15
thickening, 30-14
volume index (SVI), 30-5, 30-10, 30-12,
G-13
volume, settled, 30-6
washout, 30-13
waste activated, 30-2
wasting, 30-12
water treatment, 26-6
yield, 30-13
- Slug, 1-3, A-3, A-4
- Slump, 48-4
concrete, 49-1
grout, 67-6
test, 48-4
- Slurry
friction loss, 17-11
trench, 40-10
wall, 40-10
- Small
angle approximation, 6-3
-diameter gravity sewer, 28-4
-diameter grouted pile, 38-6
- SMAW process, 66-1
- Smog, 32-14
photochemical, 32-14
precursor, 32-14
- Smoke, 24-12, 32-15
opacity, 32-15
spot number, 24-12, 32-15
- Smooth-wheeled roller, 35-18
- Smoothing, 87-42
coefficient, 87-42
- Snug-tightened connection, 65-2
- Snyder hydrograph, 20-11
- SO₂ control, 24-5
- SOC, 28-14
- Soda ash, 26-15
- Sodium
adsorption ratio, 25-11
bicarbonate, relative proportion, 25-11
hazard, 25-11
percent, 25-11
- Soffit, 19-27 (ftn)
- Soft
material, 43-1
water, 26-16, 26-17
- Softening
ion exchange, 26-17
lime, 26-15 (ftn)
membrane, 26-22
point, Vicat, 43-11
precipitation, 22-22, 26-15, 26-17
- Soil (*see also type*), 35-2
bentonite, 40-10
boring symbols, A-106, A-107
cement, 48-8
classification, 35-3, 83-2
Classification System,
Unified, 35-4, 35-6 (tbl)
classification, AASHTO, 35-4, 35-5
classification, USCS, 35-4, 35-6 (tbl)
cohesionless, 37-2
cohesive, 37-2
failure, 35-26
gap-graded, 35-2
granular, 37-2
group, hydrologic, 20-16
incineration, 34-15
indexing formula, 35-9 (tbl)
mass-volume relationship, 35-7
moisture content, 21-2
nailing, 40-10
noncohesive, 37-2
nonplastic, 35-22
normally consolidated, 40-4, G-10
overconsolidated, 40-4
parameter formula, 35-8
particle, classification, 35-2
permeability, 21-2, 35-23
pressure, at-rest, 37-5
pressure, backward, 37-2
pressure, compressed, 37-2
pressure, forward, 37-2
pressure, tensioned, 37-2
pressure, vertical, 37-3
resilient modulus, 76-20
resistance value, 76-20
strength, 35-26
test, ASTM, 35-16, 35-17 (tbl)
test, standard, 35-16
type A, 83-2
type B, 83-2, 83-3
type C, 83-3
type, geotechnical quality, 83-3 (fig)
washing, 34-20
well-graded, 35-2
- Sol, G-13
- Soldier, 39-1
beam, 39-7
pile, 39-1, G-13
- Sole proprietorship, 88-1
- Solid
angle, 6-6
bowl centrifuge, 30-18
contact unit, 26-12
density, 35-8
incineration, 34-15
of revolution, 9-6
settleable, 34-23
volatile, G-15
volume method, 49-2
volume method, concrete, 77-2
waste, 32-2
waste, municipal, 31-1
- Solidity, 80-8
- Solids, 28-6, A-165
dissolved, 28-6
fixed, 30-4
in water (*see also type*), 25-9

- nonvolatile, 30-4
- refractory, 28-6
- residence time, 30-5
- suspended, 28-6, 29-3
- total, 28-6
- volatile, 28-6, 30-4
- washout, 30-13
- Solubility, 31-9, 34-21
 - coefficient, 22-10
 - product, 22-17
 - retrograde, G-12
- Soluble
 - BOD, 30-6
 - sodium, percent, 25-11
- Solute, 14-10 (ftn), 22-11
- Solution, 14-10, 22-11, G-13
 - Blasius, 17-45
 - buffer, 22-12
 - complementary, 10-3
 - indicator, 25-2
 - neutral, 22-12, 25-1
 - of gas in liquid, 22-9
 - particular, 10-3
 - property of, 22-10
 - regenerating, 26-18
 - saturated, 22-11
 - trivial, 3-7 (ftn)
- Solvation, 22-11
- Solvency, 87-35
- Solvent, 14-10, 22-11
 - recovery, 34-3, 34-4
- Sonic
 - boom, 14-15
 - velocity, 14-14
- Sorbent
 - injection, 34-20
 - injection, duct, 24-5
 - injection, furnace, 24-5
- Sorption, G-13
- Sound
 - limit, 83-8
 - speed of, 14-14
- Source
 - energy, 17-15
 - nonpoint, G-10
 - point, G-11
- Space
 - buffer, 73-32
 - confined, 83-6
 - mean speed, 73-3, G-13
 - mean speed versus density, 73-7 (fig)
 - mean speed versus flow, 73-7 (fig)
 - mechanics, 72-21
 - mechanics, nomenclature, 72-21 (fig)
 - pedestrian, 73-21
 - per pedestrian, 73-21
 - permittivity of free, 34-9
 - time diagram, 73-19
 - traffic, 73-32
 - work, traffic, 73-32
- Spacing, G-13
 - bracing, 59-3
 - fire hydrant, 26-24
 - gage, 60-2
 - hole, 65-1
 - molecule, 14-2
 - pitch, 60-2
 - stirrup, 50-22
 - transverse joint, 77-11
 - vehicular, 73-6
- Spalling, 76-5
- Span, 17-40
 - shear, 50-27
- Spandrel, 59-2
- Sparging, 34-20
- SPC, 11-16
- Special
 - case, polynomial, 3-4
 - condition, 46-1
 - damages, 88-7
 - triangle, 6-2
- Species, target, 85-3
- Specific
 - activity, G-13
 - area, filter, 29-9
 - capacity, 21-4
 - collection area, 34-9
 - discharge, 21-4
 - downgrade, highway, 73-12
 - energy, 13-1, 16-1, 16-9, 19-15
 - energy diagram, 19-15 (fig)
 - energy, total, 16-2 (ftn)
 - feed characteristic, 34-12
 - force, 19-15
 - gravity, 14-4, 35-8
 - gravity, apparent, 76-8
 - gravity, apparent, asphalt mixture, G-2
 - gravity, bulk, 76-8, 76-9, G-3
 - gravity, effective, 76-9, G-6
 - gravity, maximum, 76-9
 - growth rate, 28-6
 - growth rate, net, 28-7
 - heat, 13-4
 - heat, gas, 24-2
 - heat, molar, 13-4
 - heat, ratio of, 15-14
 - identification method, 87-37
 - kinetic energy, 16-1, 16-2
 - performance, 88-4, 88-6
 - permeability, 21-2
 - resistance, 34-5, 34-6
 - retention, 21-3, 21-4
 - roughness, 17-5 (tbl), A-50
 - roughness, pipe, A-50
 - speed, 18-12
 - speed versus impeller design, 18-12 (tbl)
 - speed, suction, 18-16
 - speed, turbine, 18-21, 18-23
 - storage, G-13
 - substrate utilization, 30-7
 - surface area, 29-11
 - upgrade, highway, 73-12
 - utilization, 30-7
 - volume, 14-4, 14-5
 - weight, 14-5
 - weight, concrete, 48-4
 - weight, equivalent, 37-9
 - yield, 21-3, G-13
- Specification, 58-5
 - binder, 76-15
 - pipe, 16-10
- Specifications
 - DOT geotextile, 40-11
 - kept intact, 82-11
- Specified cover, 50-8 (tbl)
- Specimen, 43-2
 - test, 43-2 (ftn)
- SpecsIntact, 82-11
- Spectrum analyzer, 9-8
- Speed (*see also type*), 71-3
 - adaptation, 75-9
 - average, travel, 73-3, 73-12
 - balanced, 72-8
 - compression wave, 17-38
 - control, motor, 84-15
 - crawl, 73-3
 - critical, 73-6
 - critical, shaft, 26-12
 - degradation on grade, 75-8
 - design, 73-3, 73-4
 - driving, 75-9
 - flow relationship, 73-8 (fig)
 - free-flow, 73-3, 73-6, 73-8, 73-10
 - legal, 73-3
 - limit, 73-3
 - limit, legal, 73-3
 - linear, 13-2 (ftn)
 - mean, 73-3, 73-4
 - median, 73-4
 - mode, 73-4
 - normal, 72-8
 - of a jet, 17-17
 - of efflux, 17-17
 - of reaction, 22-13
- of sound, 14-14
- operating, 73-3
- parameter, traffic, 73-3
- pedestrian, 73-21
- rank, 73-4
- regulation, 84-12
- rule, 79-9
- runaway, 17-36
- running, 73-3
- space mean, 73-3, G-13
- specific, 18-12
- specific, turbine, 18-23
- surge wave, 17-38
- synchronous, 18-10, 84-14
- time mean, 73-3
- tip, 18-4
- travel, 73-4
- work, 13-2
- SPF, 20-6
- Sphere, 7-12
 - formula, A-9
 - unit, 6-6
- Spherical
 - coordinate system, 7-3 (fig) (tbl)
 - defect, 6-6
 - drop, 10-10
 - excess, 6-6
 - segment, A-9
 - tank, 45-6
 - triangle, 6-6
 - trigonometry, 6-5, 6-6
- Sphericity, 17-43
- Spheroid, 78-6
- Spill
 - hazardous, 32-15
 - oil, 32-11
- Spillway, 19-13
 - coefficient, 19-13
 - dam, 19-13
 - ogee, 19-13 (ftn)
- Spiral
 - angle, 79-19
 - column, 52-2
 - curve, 79-18, 79-19 (fig)
 - curve, desirable length, 79-21
 - curve, lane encroachment, 79-20
 - curve, length, 79-19
 - curve, maximum radius, 79-21
 - deflection angle, 79-19
 - entrance, 79-18
 - exit, 79-18
 - tangent offset, 79-19
 - wire, column, 52-2
 - wire, splice, 52-3
- Spitzglass formula, 17-10
- Splice
 - length, minimum, 67-7
 - spiral wire, 52-3
- Split
 - beam, tee construction, 65-8 (fig)
 - chlorination, G-13
 - cylinder testing procedure, 48-6
 - mastic, 76-28
 - process, 26-16
 - spoon sampler, 35-16
- Splitting tensile strength test, 48-6
- Spoilage, 87-38 (ftn)
- Spoils, 39-2
- Sporozoans, 27-8
- Spot speed
 - data, 73-4
 - study, 73-4
 - average, 73-3
- Spray tower, 34-2, 34-20
 - absorber, 34-3 (fig)
 - packed bed, 34-3 (fig)
- Spread
 - footing, 36-2
 - length, 76-7
 - tandem axle, 76-18

- Spreading, 75-10
 cracking, pavement, 76-5
 rate, 76-8
- Spring, 45-20, G-13
 anticlinal, G-2
 artesian, G-2
 constant, 44-3, 45-20
 constant, combinations, 45-20
 dimple, G-5
 energy, 13-3
 ideal, 45-20
 in parallel, 45-20, 45-21
 in series, 45-20
 index, 45-20 (ftn)
 perched, G-11
 rate, 45-20
 scale, 45-20, 85-14
 stiffness, 45-20
 SPT value, 35-16
- Square
 matrix, 4-2
 tubing, 61-1
- Squirrel cage rotor, 84-14
- SSD condition, 49-3
- SSF, 14-6
- SSU, 14-6, 18-2 (ftn)
- St. Venant torsional constant, 59-4 (ftn)
- Stability, 15-18, 72-2, 85-2
 asphalt mix, 76-11
 coefficient, 53-2
 constant, 22-15
 correlation factor, 76-12
 experiment, 11-12
 Hveem, 76-14
 index, Langelier, 26-18
 index, Ryznar, 26-18
 Marshall, 76-10
 number, 39-2, 40-7
 pavement, 76-3
 relative, 28-13
 sand, cut, 39-4
 slope, clay, 40-7
 slope, Taylor chart, 40-7
 Taylor slope, 40-7 (fig)
 water, 26-18
- Stabilization, 32-15
 contact, 30-3
 lagoon, 29-4
 pond, 29-4
 sludge, 30-15
 surface, 32-7
 tank, 30-4
 time, 28-13
 treatment, 26-18
 water, 26-19
- Stabilometer
 Hveem, 76-14
 test, 35-32
 value, 76-14
- Stable equilibrium, 72-2
- Stack gas (*see also* Flue gas), 24-12
- Stadia
 interval, 78-8
 interval factor, 78-8
 measurement, horizontal, 78-8 (fig)
 measurement, inclined, 78-8 (fig)
 method, 78-8, G-13
 reading, 78-8
 survey, 78-5
- Staff gauge, 19-11
- Stage, G-13
 pump, 18-4
- Staged
 -air burner system, 34-20
 combustion, 34-20
 -fuel burner system, 34-20
- Stagnation
 energy, 16-4
 point, 16-4
 tube, 16-4
- Stainless steel, A-116, A-117, A-118
 type, 22-19 (ftn)
- Stake (*see also* type), 78-9, 81-1
 abbreviations of, 81-1
 alignment, 81-3
 cluster, 81-1
 daylight, 81-4
 guard, 81-1
 header, 81-1
 hub, 81-1
 location, 81-5 (fig)
 marking, 81-1
 marking, abbreviations, 81-2 (tbl)
 reference point, 81-1
 slope, 81-3
 slope, marking, determinant, 81-4
 witness, 81-1
- Staking, 81-1
- Stall
 angle, 17-40
 parking, 73-22
 width, 73-21
- Stand-alone navigational mode, GPS, 78-6
- Standard
 accounting principle, 87-34 (ftn)
 atmosphere, international, A-59
 atmosphere, SI, A-3, A-4
 atmospheric pressure, 14-3
 Building Code, 58-5 (ftn), 82-1
 cash flow, 87-4 (fig)
 cash flow factor, A-177
 circuit breaker, 84-9
 condition, 14-4 (ftn), 24-2
 condition, gaseous fuel, 24-2
 contract, 88-5
 cost, 87-36
 cubic feet per minute, 30-9
 cubic foot, 24-2
 design vehicle, 73-3, 73-4 (tbl), 76-18
 deviation, 11-13
 deviation of the sample, 11-13 (ftn)
 dissolved oxygen, 28-10
 enthalpy of formation, 22-18 (tbl)
 error, 11-13
 error of the mean, 11-14
 factory cost, 87-36
 flood, 20-6
 form, 7-9
 girder, AASHTO-PCI, 56-8
 gravity, 1-2
 hoisting rope, 83-10
 hole, 60-2
 hook, 50-23, 55-6 (fig)
 hook, masonry, 67-7
 motor, 84-12
 normal curve, area under, A-12
 normal deviate, 11-12
 normal table, 11-6
 normal value, 11-6, 11-12, 11-15
 normal variable, 11-12
 normal variate, 11-12
 of care, 88-6 (ftn), 88-7
 orthographic view, 2-2
 penetration resistance, 35-16
 penetration test, 35-16, 36-7
 pipe, 16-10
 polynomial form, 3-3
 project flood, 20-6
 -rate filter, 29-8
 rod, 78-10
 sequence, 3-11
 state, chemical, 22-17
 temperature and pressure, 14-4, 24-2
 truck, 76-18
 truck load, 76-18
 truck loading, 76-19
 truck, HL-93, 74-4
 wastewater, 28-15
 weld symbol, 66-3 (fig)
- Standards
 drinking water, 25-5
 fire resistance, 82-5
 industrial wastewater, 29-1
 national drinking water, 25-5
- testing, 82-3
 -writing organization, 82-3
- Standing wave, 19-18, G-13
- Stanton number, 1-9 (tbl)
- Starvation demand, 73-25
- State
 fatigue limit, 74-4 (ftn)
 limit, 74-4 (ftn)
 oxidation, 22-3
 plane coordinate system, 78-5, 78-7
 service limit, 74-4 (ftn)
 standard, chemical, 22-17
 strength limit, 74-4 (ftn)
- Statement
 common size, financial, 87-34 (ftn)
 of changes in financial
 position, 87-34 (ftn)
 of income and retained earnings, 87-34
- Static
 analysis, 47-2
 balance, 70-2
 discharge head, 18-6 (fig)
 energy, 13-3, 16-2 (ftn)
 equilibrium, 15-18, 41-6 (ftn)
 friction, 72-5
 friction, angle of, 72-6
 friction, coefficient of, 75-5
 GPS surveying, 78-6
 head, 18-6
 indeterminacy, degree of, 47-7
 pile composting, 30-20
 pressure probe, 17-27
 pressure tube, 15-2
 response, 44-8
 roller, 76-8
 suction head, 18-6
 suction lift, 18-6 (fig)
- Statical moment, 42-3, 44-10
- Statically
 determinate, 41-7
 indeterminate, 41-7, 46-1
- Statics, 41-1
 indeterminate, 46-1
- Station
 angle, 78-13
 back, 79-3
 control, 78-7
 curve, around, 79-3
 full, 78-9
 offset method, 79-5
 plus, 78-9
 survey distance, 78-9
 triangulation, 78-7
 zero plus zero zero, 79-3
- Stationary
 mixer, 49-5
 phase, 27-4
- Stationing, 78-9
 ahead, 79-3
 back, 79-3
 curve, 79-3
 forward, 79-3
- Statistic, chi-squared, 11-8
- Statistical
 error, terms, 85-3
 process control, 11-16
- Stator, pump, 18-3
- Statute, 89-1
 of frauds, 88-3 (ftn)
- Statutory rule, 89-1
- Stay-in-place formwork, 51-9
- Steady
 flow, 19-2, 19-14, G-13
 -flow energy equation, 16-2
 flow well, 21-5
 -state operation, 11-9
- Steam
 friction loss, 17-9
 point, 85-6 (ftn)
 pump, 18-2
 saturated, properties, A-60, A-61, A-62,
 A-67, A-68, A-69

stripping, 34-22
 superheated, properties, A-65,A-66, A-72
 trap, 16-14
 trap, float, 16-14
 trap, inverted bucket, 16-14
 trap, thermodynamic disc, 16-14
 trap, thermostatic, 16-14
 Steel, A-115, A-116, A-117, A-118
 area, average, 51-3 (tbl)
 area, per foot of width, 51-3
 balanced, area, 50-6
 bar, masonry, 67-7
 beam, 59-1, 59-5, 59-9 (fig)
 beam, analysis, 59-5
 beam, analysis flowchart, 59-6 (fig)
 beam, minimum cost, 50-6, 55-4
 beam width, 50-8
 blue-center, 45-21
 boiler tubing dimensions, A-49
 carbon, 58-1
 column, 61-1
 compression member, 61-1
 connector, 58-4
 cover, 50-8
 deck (*see also* Metal deck), 57-4
 distribution, 55-5 (fig)
 dual-certified, 58-6
 fiber-reinforced concrete, 77-13
 footing, minimum, 55-4
 formula, 20-5
 grade, 48-10
 high-carbon, 58-1
 high-performance, 58-6
 high-strength, 58-7
 high-strength low-alloy, 58-1
 low-carbon, 58-1
 maximum, area, 50-6
 mechanical property, 48-9
 medium-carbon, 58-1
 member, composite, 64-1
 mild-carbon, 58-1
 minimum, area, 50-6
 modulus of elasticity, 48-10
 monitor, 45-21
 nomenclature, 58-1
 pipe, 16-9
 pipe dimensions, 16-10, A-31, A-32,
 A-33, A-34,A-35, A-36, A-37
 pipe, black, 16-10
 pipe, corrugated, 16-11
 pipe, galvanized, 16-10
 pipe, plain, 16-10
 pipe, pressure drop, water, A-55
 pipe, water flow, 17-9, A-55
 plow, 45-21 (ftn)
 properties, A-79, A-80
 property, 58-2
 quenched and tempered, 58-2
 rainfall coefficients, 20-6
 rainfall region, 20-5
 ratio, 50-8, 50-12
 ratio, prestressing, 56-10
 rebar, area, 51-3
 region, 20-5
 -reinforced concrete, 15-12 (ftn)
 reinforcing, 48-8, 50-2
 reinforcing, pavement, 77-7
 reinforcing wire, A-134
 shape designation, 58-3 (tbl)
 stainless, A-116, A-117, A-118
 structural, 58-1, A-115
 structural, properties, A-115
 structural, property, 58-2 (tbl)
 structural, type, A-150
 temperature, 51-2
 tension member, 60-1
 unit, 58-1
 water pipe, 26-25
 weathering, 58-6 (ftn)
 wire gauge, 67-7
 wire, joint, 67-7
 Stem, retaining wall, 54-3

Stenothermophile, 27-6 (tbl)
 Step
 -flow aeration, 30-3
 function, 10-6
 interval, frequency distribution, 11-10
 system, 28-4
 time, simulation, 75-14
 Stepped cash flow, 87-10
 Steradian, 6-6
 Sterilization, well, 21-4
 Sterilized well equipment, 21-4
 Stiff mixture, 48-4
 Stiffened element, 61-6
 Stiffener, 59-17
 beam, 44-18
 bearing, 44-19, 59-18 (fig),63-2, 63-4 (fig)
 bearing, design, 63-4
 flange, 59-18 (fig)
 interior intermediate, 63-3
 intermediate, 44-19, 59-18,
 63-3, 63-4 (fig)
 intermediate, design, 63-4
 Stiffness, 44-2, 44-3, 47-13
 and rigidity, 44-3 (fig)
 flexural, 53-4
 method, 47-3, 47-10
 pipe, 16-11
 reduction factor, axial load, 53-4
 reduction factor, lateral load, 53-4
 ring, 16-11
 spring, 45-20
 torsional, computation, 51-7
 Stilling basin, G-13
 Stimulated production, 21-4
 Stirrup, 50-2, 50-21
 anchorage, 50-23
 spacing, 50-22
 U-shaped, 50-23
 Stochastic
 critical path model, 86-14
 simulation, 20-22
 Stoichiometric
 air, 24-9
 combustion, 24-9
 quantity, 24-9
 reaction, 22-8, 22-9
 Stoichiometry, 22-8, G-13
 biological system, 27-11
 Stoke, 14-8
 Stokes number, 1-9 (tbl)
 Stokes' law, 17-42, 26-5
 Stone
 -filled asphalt, 76-28
 mastic asphalt, 76-28
 matrix asphalt, 76-2, 76-28
 Stop sign versus signal, 73-18
 Stopping
 distance, 75-6
 sight distance, 75-6, 79-10, G-13
 Storage
 coefficient, 21-3
 constant, 21-3
 depression, G-5
 facility, 33-2
 indication method, 20-21
 pumped, 26-24
 specific, G-13
 tank, 33-1
 tank, underground, 32-15
 water, 26-24
 Storm
 century, 20-5
 characteristics, 20-2
 design, 20-4, 20-5
 frequency, 20-5
 Stormwater
 modeling, 20-23
 Story drift, 53-2
 STP (*see also* Standard temperature and
 pressure), 14-4
 gaseous fuel, 24-2
 Straddle, bisection method, 12-1

Straight
 angle, 6-1
 line, 7-4 (fig)
 -line depreciation recovery, 87-26
 line error, 45-20 (ftn)
 -line method, 20-7, 87-21, 87-26
 Strain, 43-2, 44-2
 axial, 43-4
 circumferential, 45-6
 creep, 43-16
 cyclic, 43-9 (ftn)
 diametral, 45-6
 elastic, 43-3
 energy, 43-6, 43-7, 44-2, 44-12,
 44-15, 44-17
 energy method, beam deflection, 44-15
 energy method, truss deflection, 44-17
 engineering, 43-2
 gauge, 15-2, 85-8, 85-13
 -hardening exponent, 43-5
 -hardening region, 48-9
 inelastic, 43-3
 lateral, 43-4
 limit, compression-controlled, 50-5
 log, 43-5
 net, 85-11
 physical, 43-5
 plastic, 43-3
 proportional, 43-3
 radial, 45-6
 rate of, 14-6
 sensitivity factor, 85-8
 shear, 43-8
 thermal, 44-4
 total, 43-4
 true, 43-5
 volumetric, 14-14
 Strand (*see also* Tendon), 56-5
 structural, 45-21
 Strata, layered geological, 83-3
 Strategic Highway Research Program, 76-15
 Stratosphere, 15-13, 15-14 (ftn)
 Stratum, G-13
 Straw, 80-11
 Streaking, pavement, 76-5
 Stream
 braided, G-3
 coordinates, fluid, 17-18 (fig)
 effluent, G-6
 ephemeral, G-6
 function, 17-4
 function, Lagrange, 17-4
 gaging, G-13
 gauging, 19-2
 influence, G-8
 meandering, G-9
 order, G-13
 potential function, 17-3
 power, unit, G-15
 Streamline, 16-7, 21-7
 analogy, stress concentration, 44-5 (fig)
 flow, 16-7
 Streamtube, 16-7
 Street, 73-3
 inlet, 28-5
 urban, 73-3, 73-14
 Streeter-Phelps equation, 28-10
 Strength
 acceptance testing, 49-1
 allowable bearing, 61-9
 analysis, doubly reinforced section, 50-24
 available compressive, 62-2
 available, bearing, 65-4
 axial tensile, 60-1
 beam, nominal shear, 50-21
 bearing, available, 65-4
 breaking, 43-3
 coefficient, 43-5, 76-22
 compressive, 43-8
 cracking, 40-9
 creep, 43-16
 crushing, 40-9

- D*-load, 40-9
 design, 44-2 (ftn), 50-2, 50-5, 52-3, 59-8
 design, allowable, 58-5
 design, bearing, 61-9
 design method, 45-2, 50-3
 design model for composite beam, 64-3 (fig)
 design, wall, 54-2
 endurance, 43-9, 43-10
 factor, 52-3
 fatigue, 43-9
 flexural, 59-5, 77-6
 flexural, available, 64-2, 64-3
 fracture, 43-3
 laboratory, 40-9
 law, Abrams', 48-4
 layer, 76-20
 limit state, 58-5, 74-4 (ftn)
 lower yield, 43-3
 material, 44-2
 nominal, 45-2, 50-5
 proof, 45-9, 45-13
 reduction factor, 50-5
 reduction factor, AASHTO, 56-7
 reduction factor for joint, AASHTO, 56-7 (tbl)
 reduction factor, variation, 50-6 (fig)
 required, 50-4
 rupture, 43-16
 shear, 43-8, 59-5, 63-2
 shear, concrete, 48-6
 shear, nominal concrete, 50-21
 soil, 35-26
 steel beam, 59-2, 63-2
 steel beam, plate girder, 63-1
 tensile, 43-3, 58-2
 ultimate, 43-3, 45-2
 ultimate, pipe, 40-9
 yield, 43-3, 58-2
- Stress**, 43-2, 44-2
 allowable, 45-2, 50-2
 allowable, bending, 59-15
 allowable, sheet piling, 39-4 (tbl)
 apparent yield, 43-7
 axial, 35-26
 bearing, 45-11, 45-12
 bending, 44-11 (fig), 59-2
 biaxial, 85-11
 block, 50-9
 buckling, 61-2
 circumferential, 45-4, 45-6
 combined, 44-5 (fig)
 concentration, 44-4
 concentration factor, 44-5
 concentration factor, fatigue, 43-10
 concentration, geometric, 44-4
 concentration, press-fit, 45-8, 45-9
 confining, 35-26
 contour chart, Boussinesq, A-112, A-113
 corrosion cracking, 22-20, 58-7
 critical, 17-12
 critical, beam, 59-8
 cyclic, 43-9 (ftn)
 cylinder, thick-walled, 45-6 (tbl)
 design, working, 45-2
 deviator, 35-26
 effective, 35-14, 35-27, 37-9, 40-5
 engineering, 43-2
 Euler, 45-3
 extreme fiber, 44-11
 extreme, shear, 44-6
 flexural, 44-11
 longitudinal, 45-5
 mean, 43-9
 neutral, 35-14
 normal, 44-2
 overburden, 35-15
 physical, 43-5
 principal, 44-5
 proof, 43-3 (ftn)
 radial, 35-26
 ratio, cyclic, 40-11
 relaxation, 56-6
 -relaxation test, 43-11
 riser, 44-5
 -rupture test, 43-16
 shear, 44-2
 shear, concrete beam, 50-20
 shear, fluid, 14-6
 -strain curve, 43-2 (fig), 43-4 (fig)
 -strain curve, concrete, 48-5 (fig)
 -strain curve, ductile steel, 48-9 (fig)
 -strain curve, structural steel (fig.), 58-2
 tangential, 45-4
 tendon, 56-7
 tensile, axial, 60-1
 tension, diagonal, 50-20
 total, 35-14
 true, 43-5
 yield, 17-12, 43-3, 58-2
- Strickler equation**, 19-4 (ftn)
Strict liability in tort, 88-7
Stringer, 39-2, 59-2, G-13
Strip
 column, slab, 51-6
 footing, 36-2
 middle, slab, 51-6
 surcharge, 37-8
Stripper, air, 34-20
Stripping, 34-2 (ftn)
 -AC process, 34-4 (fig)
 air, 29-12, 34-20
 ammonia, 28-14, 29-13
 factor, 34-21
 pavement, 76-5
 steam, 34-22
- Strong**
 axis, 59-2
 axis bending, 59-5
 material, 43-1
- Strouhal number**, 1-9 (tbl)
Struck capacity, 80-9
Structural, 47-1
 aluminum, A-115
 bolt, 65-1
 cell, 41-12
 compression member cross section, 61-2 (fig)
 design, flexible pavement, 76-15
 magnesium, A-115
 magnesium, properties, A-115
 number, 76-17
 number, pavement, 76-22
 plate, corrugated steel pipe, 16-11
 rope, 45-21
 section, G-13
 shape, 60-1
 shape designation, 58-3 (tbl)
 steel, 58-1, A-115
 steel, properties, 58-2 (tbl), A-115
 steel, properties, high temperature, A-151
 steel, stress-strain curve, 58-2 (fig)
 steel, type, 58-1, A-150
 strand, 45-21
 tee, 61-2
- Structurally deficient**, 74-2
Structure
 atomic, 22-2
 cell, 27-1
 composite, 44-19
 sediment, 80-11
 temporary, 83-9
- Stud**
 burn-off, 64-4
 connector, 64-4
 headed, 64-3
 material, 58-4
 shear, 64-3
 type B, 64-3, 64-4
- Student's *t*-distribution**, 11-7, A-14
Study, replacement, 87-18
Sub-base, mass diagram, 80-6
Subautogenous waste, 34-11 (ftn)
- Subbase**, G-13
Subchapter C corporation, 88-3
Subcontract, 88-4
Subcritical flow, 19-16, G-13
Subgrade, G-13
 design, confidence level, 76-22 (tbl)
 drain, 76-29, 76-30 (fig)
 modulus, 35-31, 77-6 (fig)
 parameter comparison, 76-22 (tbl)
 reaction, modulus of, 35-31, 76-20
 reaction, modulus of, Westergaard, 77-5
 value, 77-6 (tbl)
Subjective safety, 75-2
Submain, G-14
Submatrix, 4-1
Submerged
 arc weld, 66-1
 density, 35-8, 36-8
 fraction, 15-16
 mode, 19-14
 pipeline, 15-18
 rectangular weir, 19-11
 scraper, conveyor, 32-5
- Subset**, 1-1
 proper, 11-1
Subsonic
 flow regime, 14-15 (ftn)
 travel, 14-15
- Substance**
 target, 85-3
 type, reaction, 22-13
Substant target, 34-2
Substantial impairment, 82-9
Substitution, linear equation, 3-7
Substrate, 28-6, 85-8, G-14
 utilization, rate of, 30-7
 utilization, specific, 30-7
- Subsurface**
 flow, 20-7
 runoff, G-14
 water, 21-1
- Subtitle**
 C landfill, 31-3
 D landfill, 31-3
- Suburban**
 area, 73-3
 survey, 78-5
- Success, probability**, 11-3
Successive trial, 11-4
Suction, 18-4
 head, net positive, 18-14
 head, total, 18-6
 side, centrifugal pump, 18-2
 specific speed, 18-16
 specific speed available, 18-16
- Sudden**
 contraction, 17-13
 enlargement, 17-12, 17-13
- Sufficiency rating, bridge**, 74-2
Sugar, 23-2 (tbl)
- Sulfate**
 exposure category S, concrete, 48-10
 -resistant portland cement, 48-2
 sulfur, 24-3
- Sulfide**
 attack, 28-5
 cadmium, 85-5
- Sulfur**, 24-3
 -asphalt concrete, 76-29
 -extended concrete, 76-29
 concrete, 76-29
 dioxide, 32-15
 in stack gas, 32-4
 low-, coal, 24-5
 organic, 24-3
 oxide, 32-15
 point, 85-6 (ftn)
 pyritic, 24-3
 sulfate, 24-3
 trioxide, 24-3, 32-4, 32-15
- Sulfuric acid**, 32-4
Sulfurous acid, 32-15

- Sulphex, 76-29
- Sum-of-the-years' digits
 - depreciation, 87-21, 87-26
 - depreciation recovery, 87-26
- Sunk cost, 87-3
- Super high-rate filter, 29-9
- Superchlorination, 26-15, G-14
- Supercritical flow, 19-16, G-14
- Superelevation, 72-8, 72-8 (ftn), 79-7, G-14
 - railroad, 79-10
 - rate, 72-8, 79-7
 - runoff, 79-8
 - runoff rate, 79-8
 - total, 72-8
 - transition, 79-8
 - transition distance, 79-8
 - transition rate, 79-8
- Superficial
 - face velocity, 34-5
 - velocity, 21-4
- Superheated steam
 - properties, A-65, A-66, A-72
- Superior performing asphalt
 - pavement, 76-15
- Superload rating level, bridge, 74-3
- Supernatant, 30-14, 30-16, G-14
- Superpave, 76-2, 76-15
 - binder grade, 76-3 (tbl)
- Superplasticizer, 48-3
- Superposition, 44-17
 - force, 41-16
 - load, 41-16
 - method, 46-4
 - of cash flow, 87-10
 - theorem, 10-6
- Supersaturated solution, 22-11 (ftn)
- Supersonic travel, 14-15
- Supplementary
 - angle, 6-1
 - unit, 1-6 (tbl)
- Supplier, dealing with, 89-2, 89-3
- Supplier's lien, 88-5
- Supply, operating, 87-33
- Support
 - lateral, 59-2, 59-3
 - membrane, 40-10
 - pinned, 41-7
 - roller, 41-7
 - simple, 41-7
 - two-dimensional, 41-7 (tbl)
 - type, 41-7 (tbl)
- Supported membrane, 31-4
- Suppressed weir, 19-11
- Surcharge, 15-12, G-14
 - line, 37-8
 - point load, 37-8
 - soil, 37-8
 - strip, 37-8
 - uniform load, 37-8
- Surcharged sewer, G-14
- Surface
 - acting agent, 32-7 (ftn)
 - area factor, 76-6
 - area method, 76-6
 - Class A, 65-3
 - Class B, 65-3
 - detention, G-14
 - faying, 22-20, 65-3
 - finish, 2-4, 43-11 (fig), 65-3
 - finish factor, 43-10
 - finish reduction factor, endurance
 - strength, 43-11 (fig)
 - flow, 20-7 (ftn)
 - free, 16-5
 - frictionless, 41-7
 - loading, 26-6, 29-7, 29-9
 - loading rate, 29-7
 - of revolution, 9-5, 42-3 (fig)
 - recycling, 76-28
 - retention, G-14
 - runoff, 20-7 (ftn), 32-14, G-14
 - sealing, 77-12
 - stabilization, 32-7
 - temperature, 10-10
 - tension, 14-11
 - wave, 19-18
- Surfactant, 32-7
- Surficial, G-14
- Surge
 - chamber, 17-39, 18-24
 - pressure, pump, 49-8
 - tank, 17-39
 - wave, 19-18
 - wave speed, 17-38
- Survey (*see also type*), 78-5
 - class, 78-5
 - geodetic, 78-5
 - marshland, 78-5
 - mountain, 78-5
 - photogrammetric, 78-5
 - plane, 78-5
 - plane table, 78-5
 - rural, 78-5
 - stadia, 78-5
 - suburban, 78-5
 - total station, 78-5
 - urban, 78-5
 - zoned, 78-5
- Surveying, 78-1, 78-2
 - method, 78-5
 - plane, 78-1
 - position, 78-7
 - route, 78-9
 - static GPS, 78-6
- Surveyor's
 - chain, 78-7
 - tape correction, 78-8 (tbl)
 - transit, 78-12
- Susceptance, 84-5
- Susceptibility
 - frost, G-7
- Suspended
 - metal, in wastewater, 28-14
 - solids, 28-6, 29-3
 - solids, age, 30-5
 - solids, mixed liquor, 30-4
- Suspension, 22-11
- Sustainable development, ethics, 89-4
- Sutro weir, 19-14
- SVI, 30-10, 30-12
- Swale, G-14
- Swamee-Jain equation, 17-6
- Sweet mixture, concrete, 48-2
- Swell, 35-14, 40-4, 80-1, 80-9
 - factor, 80-1
- Swelling, 35-25
 - index, 35-25, 40-4
- Swing check valve, 16-12
- Switching, fuel, 32-15
- Symbols, 3-1
 - elements, A-83
 - geotextile, A-106, A-107
 - pipng, A-46
 - soil boring, A-106, A-107
 - USCS, A-106, A-107
 - well, A-106, A-107
- Symmetrical
 - even, 9-7 (tbl)
 - full-wave, 9-7 (tbl)
 - function, 7-4
 - half-wave, 9-7 (tbl)
 - matrix, 4-2
 - odd, 9-7 (tbl)
 - quarter-wave, 9-7 (tbl)
 - waveform, 9-7 (tbl)
- Symmetry
 - curve, type, 7-4
 - half-wave, 7-4
 - odd, 7-4
 - rotational, 7-4
- Synchronous
 - capacitor, 84-15
 - motor, 84-15
 - speed, 18-10, 84-14
- Syndet, 25-7
- Syngas, 24-5, 24-8
 - tire-made, 32-15
- Synthesis, 22-6
 - hydrograph, 20-13
 - organic compound, 23-3
- Synthetic
 - asphalt, 76-29
 - detergent, 25-7
 - gas, 24-5, 24-8
 - hydrograph, 20-11
 - latex, 76-5
 - membrane, 31-4
 - membrane liner, 31-4
 - organic chemical, 28-14
 - polymer, 26-8, 26-9
 - resin, 22-22
 - textured, 31-5
 - unit hydrograph, 20-11, 20-12
 - unit hydrograph, Espey, 20-12
 - zeolite, 26-17
- System
 - Absolute English, 1-4
 - accrual, 87-34
 - bookkeeping, 87-33
 - budgeting, 86-6
 - Cartesian coordinate, 7-3
 - cash, 87-34
 - cgs, 1-4
 - closed-loop recovery, 34-4
 - collinear force, 41-6
 - combined, G-4
 - concurrent force, 41-6
 - consistent, 3-7
 - consistent unit, 1-2
 - coordinate, 7-3, 71-1
 - coplanar force, 41-6
 - curve, 18-17 (fig)
 - dependent, 71-12
 - double-entry bookkeeping, 87-33
 - double-liner, 31-3
 - English engineering, 1-2
 - English gravitational, 1-3
 - factor, 74-4
 - fall arrest, 83-7
 - force, 41-6
 - force-couple, 41-4
 - general ledger, 87-33 (ftn)
 - inconsistent, 3-7
 - indeterminate, 41-8 (fig)
 - k-out-of-n, 11-10
 - linear, 71-2
 - linear force, 41-4 (fig)
 - manual bookkeeping, 87-33 (ftn)
 - metric, 1-4
 - mks, 1-5
 - ML θ T, 1-7
 - numbering, 3-1
 - open-loop recovery, 34-4
 - parallel, 11-9
 - parallel force, 41-6
 - performance curve, 18-16
 - periodic inventory, 87-37
 - perpetual inventory, 87-37
 - point of sale, 87-37
 - rectangular coordinate, 7-3
 - rectilinear, 71-2
 - redundant, 11-9
 - resultant force-couple, 41-4
 - separate, G-13
 - serial, 11-9
 - sexagesimal, 78-7
 - staged-air burner, 34-20
 - staged-fuel burner, 34-20
 - three-dimensional, 41-6
 - time, 73-27
 - unit, 1-2
 - voltage, 84-5 (ftn)
- Systematic
 - error, 85-2

- T
- t*-distribution, A-14
Student's, 11-7
- T
- beam design, 50-17
-delta rosette, 85-12
-factor, 73-8
- T_{250} temperature, 24-3
- Table
- cumulative frequency, 11-11
divided difference, 12-3 (ftn)
factor, A-177, A-178
groundwater, 37-9, 40-5
lookup method, beam deflection, 44-17
of indefinite integrals, A-10
of integrals, 9-1 (ftn)
periodic, 22-2, A-84
precedence, 86-10
standard normal, 11-6
water, G-15
- Tacheometric distance measurement, 78-8
- Tacheometry, 78-8
- Tack coat, G-14
- Tail
- curve, 11-7
race, 18-24, G-14
- Tailwater, 18-24, G-14
depression, 18-24
- Takeoff, 86-3
viewer, 86-3
- Tandem
- curb parking geometry, 73-22 (fig)
parking, 73-22
seal, 34-16
- Tangency, point of, 79-3
- Tangent
- ahead, 79-2
back, 79-1, 79-2
bulk modulus, 14-14
curve, 79-1
departure, 79-2
distance, 79-2 (tbl), 79-5
forward, 79-2
hyperbolic, 6-4, 6-5
law of, 6-5
modulus, 48-5
offset, 79-5 (fig)
offset, spiral, 79-18
plane, 8-5
point, 7-2
resistance, 75-5
runoff, 79-8
runout, 79-8
- Tangential, 71-9
acceleration, 71-8
stress, 45-4
turbine, 18-21 (ftn)
velocity, 18-22, 71-8
wheel, 18-21 (ftn)
- Tangible personal property, 87-20 (ftn)
- Tank
- above-ground storage, 33-1
aeration, 30-8
contact, 30-4
detritus, 29-6
discharge, 17-16, 17-17 (fig)
pressurized, 17-18
reactor, 34-7
sedimentation, 26-5
septic, 29-2
skimming, 29-7
spherical, 45-6
stabilization, 30-4
storage, 33-1
surge, 17-39
thick-walled (*see also* Cylinder, thick-walled), 45-5, 45-6
thin-walled, 45-4
time to empty, 17-19
underground, 32-15
upflow, 26-12
- Tap, 85-3
hole, 15-3
- Tape
- steel, 78-7
survey, 78-7
- Taper, 73-31
channelization, 73-31
downstream, 73-31
length, 73-32
length criteria, 73-32 (tbl)
merging, 73-32
nonmerging, 73-32
parabolic, 79-5
shifting, 73-32
shoulder, 73-32
two-way traffic, 73-32
- Tapered
- aeration, 30-3
diameter changes, 17-13
energy, 26-12
flocculation, 26-12
- Tapeworm, 27-8
- Taping, 78-7
- Tar
- coal, epoxy, 16-11
pipe coating, 16-11
- Target
- optimum asphalt content, 76-11
species, 85-3
substance, 34-2, 85-3
- Targeted chlorination, 32-6
- Task driving, 75-8
- Taste in water, 26-15
- Tax
- bracket, 87-25
credit, 87-25
- Taxation
- check the box, 88-3 (ftn)
double, 88-2
- Taxiway, 73-30
airport, 79-21
high-speed, 73-31
- Taxonomy, G-14
- Taylor slope stability, 40-7 (fig)
chart, 40-7
- Taylor's
- formula, 8-8
series, 8-8
- TCLP, 32-2
- Technique, safety management, 75-10
- Technology
- best available, 34-2
best available control, 34-2
maximum available control, 34-2
reasonably available control, 34-2
- Tee-beam (*see also* T-beam), 50-17
- Telecommunication device for the deaf, 82-11
- Telecommunications Relay Service (TRS), 82-11
- Telescope, 78-9
- Telescopic instrument, 78-5
- Teletypewriter, 82-11
- Temperature
- adiabatic flame, 24-15
air, mean annual, 76-16
and pressure, normal, 24-3
asphalt, 76-11 (fig)
autoignition, 24-8
average daily air, 49-6
coefficient, 85-5
combustion, 24-15
conversion, SI, A-3, A-5
deflection, 43-11
detectors, resistance, 85-5
dissociation, 24-15 (ftn)
ductile transition, 43-15
effect on output, 85-13
flame, 24-15
flue gas, 24-14
fracture appearance transition, 43-15
fracture transition, plastic, 43-15
ignition, 24-8
maximum flame, 24-15 (ftn)
maximum theoretical combustion, 24-15
net stack, 24-14
paving, 76-7
range, bacterial growth, 27-4
reaction, 22-13
reference, 85-6
rise, 13-4
steel, 51-2
surface, 10-10
 T_{250} , 24-3
transition, 43-15
variation constant, 28-8
- Temporary
- benchmark, 78-7
berm, 80-10
hardness, 22-21, G-14
slope drain, 80-10
structure, 83-9
traffic control, 73-31
traffic control zone, 73-31
traffic control zone section, 73-31 (fig)
- Ten States' Standards, 28-2, 30-5, A-104, A-105
- Tendency, central, 11-12
- Tender mix, 76-5
- Tendon, 39-5
- AASHTO concrete compressive stress limit, prestressing, 56-8 (tbl)
aramid, 56-6
bonded, 56-2
corrosion, 56-6
prestress, 56-3
prestressing, ASTM, 56-5 (tbl)
stress, 56-7
typical cross section for seven-wire prestressing, 56-5 (fig)
unbonded, 56-2
- Tensile
- capacity, pile, 38-4, 38-5
ductile failure, type, 43-5 (fig)
force, 41-16
strain, net, 50-5
strength, 43-3, 58-2
strength test, splitting, 48-6 (fig)
strength, splitting, 48-6
stress, 60-1, 65-4
stress limit, prestressed concrete, AASHTO, 56-7 (tbl)
test, 43-2
test performance, typical, plastic, 43-11 (fig)
zone, bridge beam, 56-8 (fig)
- Tensiometer, 21-2
- Tension
- cable, 72-13
cable, guardrail, 75-13
cable, suspended mass, 72-13 (fig)
connection, 65-6
connection, concentric, 66-4
connection, nonconcentric, 66-5
-controlled section, 50-5
direct-, indicating, 45-13
field action, 63-2, 63-3
field action equation, 63-3
force, 41-16
member, 60-1 (fig), 60-7
member analysis, 60-4, 60-5 (fig)
member design, 60-6
member design, LRFD, 60-6 (fig)
member, staggered holes, 60-2 (fig)
member, uniform thickness, unstaggered holes, 60-2 (fig)
member, unstaggered row of holes, 60-2 (fig)
pier, 44-12 (fig)
pile, 38-5
steel, 50-5 (fig)
steel, extreme, 50-5
stress, diagonal, 50-20
surface, 14-11

- Tensioned soil pressure, 37-2
 Tensor, 5-1
 Term
 confinement, 55-5
 general, 3-10
 in a sequence, 3-10
 Terminal
 pavement serviceability index, 76-20
 point, 5-1
 serviceability index, 76-17
 value, 87-16
 velocity, 17-43, 72-19
 Terminology
 facility, 73-2
 Terms
 harmonic, 9-7
 separation of, 9-3
 Ternary
 acid, 22-4
 compound, 22-4
 Tertiary
 compound, 22-4
 creep, 43-16
 pond, 29-4
 treatment, 29-3
 Terzaghi
 bearing capacity factor, 36-3
 factor, 36-3 (tbl)
 -Meyerhof equation, 36-3
 Test (*see also type*)
 ASTM, soil, 35-17 (tbl)
 Atterberg limit, 35-3, 35-21
 BOD, 27-9, 28-9
 Brinell hardness, 43-13
 CD, 35-28
 Charpy, 43-15
 chi-squared, 75-12
 comparison, 3-12
 concrete strength, 49-1
 cone penetrometer, 35-18
 confined compression, 35-24
 confirmed, G-5
 consolidated-drained, 35-28
 consolidated-undrained, 35-28
 consolidation, 35-24
 constant-head, 35-23
 CPT, 35-18
 CU, 35-28
 destructive, 43-14, 82-4
 direct shear, 35-25
 double-ring infiltration, 21-9
 falling-head, 35-23
 fatigue, 43-9
 field density, 35-21
 financial, 87-34, 87-35
 fire resistivity, 82-4
 for convergence, 3-12
 hardness, 43-13, 43-14 (tbl)
 Hveem's resistance value, 35-31
 hydrometer, 35-2
 hypothesis, 11-15
 impact, 43-15
 in-place density, 35-21
 Knoop, 43-13
 Los Angeles abrasion, 76-4
 Marshall mix design, 76-12 (fig)
 Meyer, 43-13
 Meyer-Vickers, 43-13
 Mohs, 43-13
 nondestructive, 43-11, 43-12, 43-14, 82-4
 oedometer, 35-24
 penetration, 35-16
 penetration, standard, 36-7
 permeability, 35-23
 plastic, 43-10, 43-11
 plate bearing value, 35-31
 power of the, 11-15
 presumptive, G-11
 Proctor, 35-18, 35-19
 proof, 11-9
 Q-, 35-28
 quick, 35-28
 R-, 35-28
 ratio, 3-12
 rebound, 43-14
 Rockwell hardness, 43-13
 S-, 35-28
 Scleroscopic hardness, 43-14
 scratch hardness, 43-13
 settling column, 26-6
 Shore hardness, 43-14
 sieve, 35-2
 single strength, 49-1
 sliding plate viscometer, 14-6
 slow, 35-28
 slump, 48-4
 soil, standard, 35-16
 specimen, 43-2 (ftn)
 splitting tensile strength, 48-6
 SPT, 35-16
 stabilometer, 35-32
 stress-rupture, 43-16
 tensile, 43-2
 third-point loading, flexure, 77-6
 three-edge bearing, 16-11
 torsion, 43-8
 triaxial, 35-26
 ultrasonic, 43-14
 unconfined compressive strength, 35-29
 unconsolidated-undrained, 35-28
 UU, 35-28
 vane-shear, 35-29
 Vickers, 43-13
 Testing
 boiler feedwater, 22-24
 dye penetrant, 82-4
 hypothesis, 75-12
 laboratories, 82-3
 magnetic particle, 82-4
 Marshall, 76-11 (fig)
 nuclear gauge, 76-9
 standards, 82-3
 ultrasonic, 82-4
 Textured synthetic cap, 31-5
 Thaw, freeze, 48-10
 Theis equation, 21-7
 Theodolite, 78-9, 78-12, G-14
 Theorem, 10-6
 Bayes', 11-4
 binomial, 3-3
 Buckingham pi-, 1-10
 buoyancy, 15-16
 Cauchy-Schwartz, 5-3
 central limit, 11-14
 de Moivre's, 3-8
 Green's, 2-4
 Kutta-Joukowski, 17-41
 linearity, 10-6
 of calculus, fundamental, 9-4
 of Fourier, 9-7
 of Pappus, 9-5
 of Pappus-Guldinus, 42-3
 parallel axis, 42-4, 70-2
 perpendicular axis, 42-6
 Pythagorean, 6-2
 superposition, 10-6
 time-shifting, 10-6
 transfer axis, 42-4
 Varignon's, 41-3
 Theoretical
 horsepower, 17-15
 yield, 22-9
 Theory
 Coulomb earth pressure, 37-3, 37-5
 distortion energy, 43-8
 log-spiral, 37-3
 maximum shear stress, 43-8
 Prandtl's boundary layer, 17-44
 probability, 11-2
 queuing, 73-27
 Rankine earth pressure, 37-3, 37-5
 von Mises, 43-8
 Therm (unit), 13-1
 Thermal
 ballast, 34-13
 coefficient of expansion, 14-13 (ftn)
 cracking, 24-2
 deflection temperature, 43-11
 deformation, 44-3
 desorption, 34-22
 efficiency, 24-16
 energy, 13-4 (ftn)
 expansion, area, 44-4 (fig)
 expansion, coefficient, 44-4
 load, 47-3
 -mechanical controlled processing, 58-6
 NOx, 32-9
 resistance, coefficient, 85-6
 strain, 44-4
 Thermistor, 85-5
 Thermocline, G-14
 Thermocouple, 85-6
 material, 85-7
 thermoelectric constants, A-175, A-176
 Thermodynamic disc steam trap, 16-14
 Thermoelectric constant,
 85-7, A-175, A-176
 Thermometer, resistance, 85-5
 Thermophile, 27-6 (tbl)
 Thermophilic bacteria, G-14
 Thermopile, 85-7
 Thermostatic steam trap, 16-14
 Thick-walled cylinder, 45-5, 45-6
 Thickening
 batch gravity, 30-14
 dissolved air flotation, 30-14
 gravity, 30-14
 gravity belt, 30-15
 sludge, 30-14
 Thickness
 base plate, 61-10
 effective throat, 45-14
 minimum, asphalt, 76-24 (tbl)
 minimum, pavement, 76-22, 76-25
 Thiem equation, 21-6
 Thiessen method, 20-2
 Thin
 overlay, 77-13
 -walled tank, 45-4
 Thiobacillus, 28-5
 Third
 -point loading, 48-6
 -point loading flexure test, 77-6
 moment about the mean, 11-14
 Thixotropic
 fluid, 14-7
 liquid, 14-7
 Thixotropy, G-14
 THM, 25-10
 Thompson effect, 85-7 (ftn)
 Thoracic fraction, 32-7
 Thread
 angle, helix, 45-14
 half angle, 45-14
 Threaded
 fitting, 17-12 (ftn)
 member, tension, 60-7
 Three
 -dimensional equilibrium, 41-21
 -dimensional mensuration, A-9
 -edge bearing test, 16-11
 -force member, 41-7
 -moment equation, 46-5
 -phase electricity, 84-10
 -phase signal, 73-14
 -reservoir problem, 17-22
 Threshold
 level value, 83-4, 83-6
 odor number, 26-15, G-14
 vector, 31-5
 Throat
 effective weld, 45-14
 size, effective, 45-14
 thickness, 66-2
 thickness, effective, 45-14

- Throttling
discharge, 18-18 (fig)
service, 16-12
- Thumb penetration test, 83-3
- Tie, 39-5
bar spacing, pavement, 77-7, 77-10 (fig)
bar spacing, PCC pavement, 77-10 (fig)
bar, pavement, 77-7
form, 49-6
lateral, masonry column, 69-2
pintle, 68-16
rod, 39-5
wall, 68-14
- Tieback, 39-5
- Tied
bulkhead, 39-4, 39-5
column, 52-2
- Tile
bed, 29-2
field, 29-2
- Till, G-14
glacial, G-7
- Time (*see also type*)
base, 20-7
bed residence, 34-7
braking perception-reaction, 75-6
constant, 3-11
-cost trade-off, 86-9
crash, 86-9
decoloration, 28-13
-dependent loss, 56-4
detention, 26-6; 29-7
doubling, 3-11, 87-8
doubling, interest rate, 87-9 (tbl)
e-folding, 3-11
exposure, 34-8, 34-9
factor, 40-5
factors, consolidation, 40-5
filtration, 34-6
float, 86-11
hydraulic detention, 30-8
lag, 20-11
lost, 73-15
mean cell residence, 30-8
mean residence, 29-7, 32-9
mean speed, 73-3, G-14
mission, 11-9
of concentration, 20-3, G-14
per unit, average, 87-43
perception-reaction, 79-10
periodic, 72-20
PIEV, 75-6
PRT, 75-6
residence, 34-8, 34-9
retention, 26-6, 29-7
retention, hydraulic, 30-7
rule, 79-9
-series analysis, 9-8 (ftn)
service, 73-27
-shifting theorem, 10-6
slack, 86-11
-space diagram, 73-19
-space diagram bandwidth, 73-20 (fig)
-space diagram construction, 73-19 (fig)
stabilization, 28-13
system, 73-27
to double, 87-8
to empty tank, 17-19
to peak, 20-11
to triple, 87-8
tripling, 87-8
tripling, interest rate, 87-9 (tbl)
value of money, 87-5
waiting, 73-27
-weighted average, 83-8
- Time-dependent loss, 56-4
- Timing
on demand, 73-20
traffic-activated, 73-20
- Tip
resistance, 38-2
speed, 18-4
- Tipping fee, 31-2
- Tire
coefficient of friction, 75-5
-derived fuel, 24-4
discarded, 32-15
- Titania, 24-3 (ftn)
- Titration, 25-2
- TKN, 28-14
- Toe, 37-12
circle failure, 40-7
dam, 15-11, 15-12
excavation, 39-2
kick-out, 39-5
retaining wall, 54-4
wash-out, 39-5
- Tolerance, 2-4
- Ton (*see also* Threshold odor number), 1-7, 26-15, G-14
explosive, 1-7
freight, 1-7
long, 1-7, A-3, A-4
measurement, 1-7
metric, 1-7
of explosive power, 1-7
refrigeration, 1-7, A-3, A-5
short, 1-7, A-3, A-4
- Tonnage, 74-2
rating, railroad, 75-4
- Tonne, 1-7
- Top
cap, 31-5
chord, 61-1
plate construction, 65-8 (fig)
tower, crane, 83-10
- Topographic map, 78-21 (fig)
symbols, 78-21 (fig)
- Topography, G-14
- Torque, 41-2, 47-3
bolt, 45-13
coefficient, 45-13
conversion, SI, A-3, A-5
electrical motor, 84-12
hydrostatic, 15-11
meter, 85-13, 85-14
on a gate, 15-11
pump shaft, 18-11
shaft, 45-14
- Torr, A-3, A-4
- Torricelli equation, 17-17
- Torricelli's speed of efflux, 17-17
- Torsion
angle, 43-8, 45-14
balance, Du Nouy, 14-11 (ftn)
dynamometer, 85-13
noncircular shape, 45-16
shell, 45-15
solid member, 45-16
test, 43-8
- Torsional
axis, 45-17
buckling, 59-4, 61-2
buckling, lateral, 59-3
center, 45-17
constant, 59-4
eccentricity, 45-17
shear, 66-6
stiffness, computation, 51-7
- Tort, 88-6
action, 88-6
strict liability in, 88-7
- Torus formula, A-9
- Torvane shear vane test, 83-3
- Total
active resultant, 37-3
air void, 76-9
coliform, 27-8
cost, 87-33
density, soil, 35-7
discharge head, 18-7
dissolved solids, 25-9, 26-19 (tbl)
dynamic head, 18-7
energy, 16-2, 16-4
energy line, 17-15
fixed solids, 25-9
float, G-14
hardness, 22-21
head, 16-2, 18-6, 18-7
head added, 18-7
incidence rate, 83-2
Kjeldahl nitrogen, 28-14
lime, 26-9
metal (in wastewater), 28-14
nitrogen, 25-8, 28-14
phosphorous, 25-7
pressure, 16-2, 37-9
rainfall, 20-17
ramp density, 73-9
removed fraction, 26-6
residual chlorine, 32-6, 34-8
residual oxidant, 29-13
solids, 25-9, 28-6
specific energy, 16-2 (ftn)
station survey, 78-5
station, automatic, 78-5
station, manual, 78-5
strain, 0.5%, 43-4
stress, 35-14
suction head, 18-6, 18-7
superelevation, 72-8
suspended solids, 25-9
volatile solids, 25-9
- Tough material, 43-1, 43-7
- Toughness, 43-7, 43-14, 58-2
elastic, 43-7
modulus of, 43-7
notch, 43-14, 43-15
test, 43-14
- Tower
cooling, 32-6
crane, 83-10 (fig)
oxidation, 29-9
packed, 34-3, 34-20
spray, 34-2, 34-20
top, crane, 83-10
tray, 34-20
- Town gas, 24-8 (ftn)
- Township, 78-20, G-14
number, 78-20
subdivision, 78-20 (fig)
- Toxaphene, 32-12
- Toxic air, 32-2
- Toxicity, 25-8
characteristic leaching procedure (TCLP), 32-2
- Toxin, G-14
- Trace organic, 29-3
- Tracking, fast, 86-9
- Tract, 78-20
- Tractive
effort, 75-3
force, 75-3
force, locomotive, 75-4
- Trade-in allowance, 87-18
difference, 87-18
- Traditional organochlorine pesticide, 32-12
- Traditionality, 75-10
- Traffic (*see also type*), 73-3, 76-16
-activated controller, 73-20
-activated timing, 73-20
calming, 73-27
control zone, temporary, 73-31
control, temporary, 73-31
design, 76-17
recorder, automatic, 73-6
signal, resonant cycle, 73-16
space, 73-32
volume data, 75-15, 75-16
- Trailer, aggregate, 80-9
- Train, cold, 76-28
- Tranquil, flow, 19-16, G-14
- Transaction, short-term, 87-3
- Transcendental function
circular, 6-2

- integral of, 9-1
- derivative, 8-2
- Transducer, 15-2, 85-3
 - potentiometer, 85-3
- Transfer
 - axis theorem, 42-4
 - efficiency, 26-4
 - efficiency, oxygen, 30-9
 - heat, 30-17
 - load, 77-7
 - truck, 80-9
 - unit, 34-22
 - unit method, 34-22
 - unit, height of, 34-22
 - units, number, 34-19
- Transform
 - fast Fourier, 9-8
 - Laplace, 10-5, A-11
- Transformation
 - coefficient of, 5-3
 - matrix, 5-3
- Transformed moment of inertia, 50-15
- Transformer, 84-6
- Transgranular, 22-20
- Transit, 78-9, 78-12
 - engineer's, 78-12
 - rule, 78-15
 - surveyor's, 78-12
- Transition
 - channel, 19-16
 - curve, 79-18
 - distance, superelevation, 79-8
 - element, 22-3
 - metal, 22-3 (ftn)
 - rate, 79-8
 - region, 16-7
 - section, 50-5
 - superelevation, 79-8
 - temperature, 43-15
 - temperature, ductile, 43-15
 - trench width, 40-9
 - zone, 30-14
- Translation, pure, 72-2
- Transmissible vector, 5-1 (ftn)
- Transmission
 - dynamometer, 85-13
 - gear ratio, 75-3
 - rope, 45-21
 - waterborne disease, 27-10
- Transmissivity, 21-3, G-14
 - coefficient of, 21-3
- Transmittance
 - smoke, 32-15
- Transonic travel, 14-15
- Transpiration, G-14
- Transport
 - airport, 79-21
 - cell, 27-2
 - loss, 80-9
- Transportation
 - network, 75-2, 75-15
 - network screening, 75-17
 - network diagnosis, 75-17
 - project, 75-15
- Transpose, 4-5
- Transverse
 - axis, 7-11
 - component, 71-9
 - force, beam, 44-11
 - joint spacing, 77-11
 - joint spacing, pavement, 77-11 (tbl)
 - load, truss, 41-16
 - loading, 41-16
 - pitot tube, G-11
 - pressure, 17-28
 - reinforcement index, 55-5
 - sensitivity factor, 85-9
 - truss member load, 41-16 (fig)
 - velocity, 71-9
- Trap
 - sand, G-12
 - steam, 16-14
- steam, float, 16-14
- steam, inverted bucket, 16-14
- steam, thermodynamic disc, 16-14
- steam, thermostatic, 16-14
- Trapezoid formula, A-7, A-8
- Trapezoidal
 - channel, 19-7, 19-8, 19-9
 - channel conveyance factor, A-84, A-87
 - cross section, 19-8 (fig)
 - loading curve, 41-6
 - rule, 7-1, 78-17
 - weir, 19-13
- Trash, 24-4
 - rack, 26-3, 29-6
- Trashphalt, 76-29
- Travel
 - hypersonic, 14-15
 - speed, 73-4
 - supersonic, 14-15
 - transonic, 14-15
- Traveled
 - distance, 71-3
 - way, G-14
- Traverse, 78-13
 - angle, 78-13 (fig)
 - area, 78-16, 78-17
 - closed, 78-13
 - closure, 78-15 (fig)
 - closure error, 78-5 (tbl)
 - Crandall rule, balancing, 78-15
 - least squares, balancing, 78-15
 - open, 78-13
 - partial, 78-16 (fig)
 - pitot tube, G-11
- Tray tower, 34-20
- Treatment
 - advanced wastewater, 29-3
 - all-volatile, 22-24
 - caustic phosphate, 22-24
 - efficiency, 30-6
 - facility, 33-2
 - highway safety, 75-15
 - leachate, 31-8
 - method, water supply, 26-4 (tbl)
 - partial, G-10
 - penetration, G-11
 - plant, wastewater, 29-3
 - preliminary, 29-3
 - primary, 29-3
 - secondary, 29-3
 - shock, 28-5
 - tertiary, 29-3
 - wastewater, 34-22
 - zero-solids, 22-24
- Tremie, concrete, 40-10
- Trench
 - anchor, 31-4
 - cement bentonite slurry, 40-10
 - method, landfill, 31-2
 - shield, 83-3
 - slurry, 40-10
 - width, transition, 40-9
- Trenching, 39-1, 83-3
 - safety, 83-3
- Trenchless method, 40-11
- Trenchsheet, 39-4
- Trestle, 41-13
- Triad, Cartesian, 5-2
- Triadimenol, 32-12
- Trial, 11-2
 - batch method, 49-2
 - mix method, 49-2
 - successive, 11-4
- Triangle, 6-2
 - formula, A-7
 - general, 6-5 (fig)
 - oblique, 6-5
 - oblique, equations, A-172
 - Pascal's, 3-3
 - right, 6-2
 - similar, 6-2
- special, 6-2
- spherical, 6-6
- Triangular
 - channel, 19-7
 - matrix, 4-2
 - pressure distribution, 39-1
 - unit hydrograph, 20-12
 - weir, 19-13
- Triangulation, 78-5
 - station, 78-7
- Triaxial stress test, 35-26
- Triazine, 32-12
- Trichlorophenol, 25-10
- Trickling filter, 29-8
- Trigonometric
 - form, 3-7
 - function, 6-2
 - functions in a unit circle, 6-3 (fig)
 - identity, 6-2, 6-3, 6-4, 6-5
- Trigonometry, spherical, 6-5, 6-6
- Trihalomethane, 25-10
- Trihedral angle, 6-6
- Trilateration, 78-5
- Trimetric view, 2-3
- Trioxide, sulfur, 24-3, 32-15
- Trip generation, 73-5
- Triphosphate, adenosine, G-1
- Triple
 - cross product, 5-5
 - integral, 9-3
 - product, mixed, 5-4, 5-5
 - scalar product, 5-5
- Triplex pump, 18-2
- Tripling time, 87-8, 87-9
 - interest rate, 87-9 (tbl)
- Tripod, 41-22 (fig)
- Tritium, 22-2
- Trivial solution, 3-7 (ftn)
- Trolley crane, 83-10
- Tropopause, 15-14 (ftn)
- Troposphere, 15-14 (ftn)
- Truck
 - equivalent, 73-7
 - factor, 76-17
 - HL-93, 76-18
 - HS20-44, 76-18
 - loading type, 76-19 (fig)
 - loading, standard, 76-19
 - standard, 76-18
 - transfer, 80-9
 - type, standard, 76-18
- True
 - color, in water, 25-8
 - meridian, 78-12
 - strain, 43-5
 - stress, 43-5
- Trumpet interchange, 73-25
- Trunk, 28-2
- Truss, 41-12
 - bridge, 41-12, 41-13 (fig)
 - deflection, 44-17, 47-4
 - determinate, 41-13
 - indeterminate, 46-7
 - pipe, 16-10, 28-4
 - rigid, 41-12
 - transverse load, 41-16
 - type, 41-13 (fig)
- Tschebotarioff trapezoidal pressure
 - distribution, 39-2
- TSS, A-104, A-105
- Tube (*see also* Tubing)
 - impact, 16-4
 - laminar, 26-6
 - piezometer, 15-2
 - pitot, 16-4
 - stagnation, 16-4
 - static pressure, 15-2
- Tubing
 - copper, 16-9
 - dimensions, brass and copper, A-48
 - dimensions, BWG, A-49
 - dimensions, copper, A-47

- dimensions, seamless steel, boiler, A-49
- dimensions, steel, boiler, A-49
- Tubular
 - ESP, 34-8 (ftn)
 - flow, 30-6
- Tunnel, wind, 17-42
- Turbid water, 25-9
- Turbidity, 25-8, G-14
 - unit, G-14
 - unit, nephelometric, 25-8, G-10
- Turbine, 17-15
 - axial-flow, 18-24 (fig)
 - axial-flow reaction, 18-23
 - Francis, 18-23
 - high-head, 18-21
 - impulse, 17-36, 18-21
 - meter, 17-27
 - mixed-flow reaction, 18-23
 - power, 17-36, 18-22
 - propeller, 18-23
 - radial-flow reaction, 18-23
 - reaction, 18-23
 - runner, 18-21
 - specific speed, 18-21
 - tangential, 18-21 (ftn)
 - type, 18-23
- Turbulent flow, 16-7, 17-5
- Turning
 - point, 79-12
 - radius, 73-3
- Turnout, G-14
- Turns ratio, 84-6
- Turntable crane, 83-10
- TWA, 83-8
- Twaddell scale, 14-5 (ftn)
- Twist
 - angle, 43-8, 45-14
 - center, 45-17
 - off bolt, 65-1
- Two
 - angle formula, 6-4
 - dimensional mechanism, 41-20
 - dimensional mensuration, A-7
 - dimensional reaction, 41-8
 - dimensional space, vector in, 5-1 (fig)
 - force member, 41-6, 41-12
 - lane highway, 73-12
 - lines, angle, 7-8
 - metal corrosion, 22-18
 - phase signal, 73-14
 - point form, 7-5
 - points, distance, 7-7
 - sided weaving section, single-lane ramp, 73-26
 - sided weaving segment, 73-26, 73-27 (fig)
 - stage process, 26-16
 - stage trickling filter, 29-10
 - tail confidence limit, 11-15
 - way drainage, 40-5
 - way shear, 55-3
 - way slab, 51-5 (fig), 51-7 (fig), 51-8
 - way traffic taper, 73-32
 - wire joint reinforcement, 67-7
- Type
 - 1 connection, 65-7
 - 2 connection, 65-7
 - 3 connection, 65-7
 - 3 truck, 74-3
 - 3-3 truck, 74-3
 - 3-S2 truck, 74-3
 - I building, 82-8
 - I error, 11-14
 - I settling, 26-5 (ftn)
 - II error, 11-15
 - II settling, 26-5 (ftn)
 - V building, 82-8
 - arrival, 73-16
 - A soil, 83-2
 - B soil, 83-2, 83-3
 - B stud, 64-3, 64-4
 - C soil, 83-3
 - cover, 20-17
 - n flow, culvert, 19-29
 - number, 3-1
 - of flow, 19-2
 - of view, 2-1
 - structural bolt, 45-9 (ftn)
 - structural steel, 58-1, A-150
 - valve, 16-13 (fig)
- Typical section, 80-3
- U
- U
 - tube manometer (*see also* Manometer), 15-2
 - waste, 32-2
- UBC, 82-1
- UL, 82-3
 - label, 82-3
- Ultimate
 - analysis, 22-5, 22-6, 24-2
 - bearing capacity, 36-3
 - BOD, 28-9
 - CO₂, 24-13
 - load, 47-2
 - plastic moment, 59-12
 - shear, 59-12
 - static bearing capacity, pile, 38-1
 - strength, 43-3, 45-2
 - strength design, 44-2 (ftn), 59-8
 - strength, pipe, 40-9
- Ultra
 - low NOx burner, 34-15
 - thin whitetopping, 76-29
- Ultrafilter, 26-14
- Ultrasonic
 - flowmeter, 17-28
 - test, 43-14
 - testing, 82-4
- Ultrasound imaging test, 43-12
- Ultraviolet radiation, 26-21
- Unaccounted-for water, 26-25
- Unadjusted basis, 87-21
- Unavailable combined residual, 28-13
- Unbalanced
 - centrifugal ratio, 79-7
 - force, 41-1, 72-4
- Unbiased estimator, 11-12, 11-13
- Unbonded
 - strain gauge, 85-8 (ftn)
 - tendon, 56-2
- Unbraced
 - column, 53-2, 53-5
 - frame, 53-2 (fig)
 - length versus available moment, 59-3 (fig)
- Unburned fuel loss, 24-16
- Uncertainty analysis, 87-44
- Unconfined
 - aquifer, 21-1, 21-2
 - compressive strength test, 35-29
- Unconsolidated-undrained test, 35-28
- Unconstrained motion, 72-11 (fig)
- Under-reinforced beam, 50-6
- Underground
 - storage tank, 32-15
 - water, 21-1
- Undersaturated condition, 73-28
- Underwriters Laboratories, 82-3
- Undetermined coefficients, method
 - of, 3-6, 10-4
- Undivided highway, 73-3
- Undrained case, 36-5
- Unequal
 - angle, 61-1
 - tangent vertical curve, 79-17
- Unfilled composite grid deck, 57-4
- Unified
 - method, 50-3
 - Soil Classification System, 35-4, 35-6 (tbl)
 - strength design method, 50-3
- Uniform
 - acceleration, 71-3
 - acceleration formulas, 71-4 (tbl)
 - annual cost, equivalent, 87-7
 - attack corrosion, 22-19
 - bar in torsion, 43-9 (fig)
 - exam, 90-2
 - flow, 16-9, 19-2, 19-4, 19-6, G-14
 - gradient factor, 87-8
 - load surcharge, 37-8
 - motion, 71-3
 - series cash flow, 87-3
- Uniform Building Code*, 58-5 (ftn), 82-1
- Uniformity coefficient
 - of, 21-5
 - Hazen, 35-2
- Uninterrupted flow, 73-3
- Union, set, 11-1
- Unit
 - circle, 6-1
 - hydrograph, 20-8
 - hydrograph, Espey 10-minute, 20-13
 - hydrograph, NRCS dimensionless, 20-12
 - hydrograph, synthetic, 20-11, 20-12
 - hydrograph, synthetic, Espey, 20-12
 - hydrograph, triangular, 20-12
 - hyperbola, 6-5
 - impulse function, 10-6
 - load method, 44-18
 - matrix, 4-2
 - process, G-15
 - sphere, 6-6
 - steel, 58-1
 - step function, 10-6
 - strength method, 67-3
 - transfer, 34-22
 - vector, 5-2, 41-2
 - vector, Cartesian, 5-2 (fig)
 - weight, 14-5, 35-7
 - weight coefficient, 49-8
 - weight, concrete, 48-4
 - weight, dry, at zero air voids, 35-18
 - width flow, 73-21
- United States Rectangular Surveying System, 78-20
- Units
 - angstrom, A-1, A-2
 - base, 1-5
 - chemical concentration, 22-11
 - consistent system of, 1-2
 - derived, 1-6 (tbl)
 - flow rate, pedestrian, 73-21
 - nephelometric turbidity, 25-8, G-10
 - non-SI, 1-7
 - number of transfer, 34-19
 - of pressure, 14-2
 - primary, 1-7
 - of production depreciation, 87-22
 - shaft friction, 38-3
 - SI, 1-5
 - SI conversion, A-3
 - SI derived, 1-5, 1-6
 - stream power, G-15
 - supplementary, 1-6 (tbl)
 - turbidity, G-14
 - velocity, 21-4 (ftn)
- Unity equation, 68-8
- Universal
 - constant, Newton's, 72-20
 - gas constant, 14-10
 - gravitation, Newton's law of, 72-20
 - mill plate width tolerance, 58-3 (tbl)
 - set, 11-1
 - Transverse Mercator, 78-5, 78-22
- Universe, 11-3
- Unloading
 - and reloading curve, 43-7 (fig)
 - curve, 43-7
- Unreinforced
 - masonry, 68-3
 - membrane, 31-4
- Unsaturated hydrocarbon, 23-2 (tbl), 24-1
- Unshored construction, 57-3, 64-2
- Unstable equilibrium, 72-2

- Unsteady flow, well, 21-6
- Unstiffened element, 61-6
- Unsupported
 - length, steel beam, 59-4
 - membrane, 31-4
- Unsymmetrical
 - bending, beam, 59-15
 - bending, case, 59-15 (fig)
 - vertical curve, 79-17
- Unwatering, 80-11
- Upflow tank, 26-12
- Upgrade
 - coal, 24-5
 - specific, highway, 73-12
- Upheaving, pavement, 76-5
- Uplift, G-15
 - force, 21-9
 - pressure, 21-9
- Upper
 - bound, 9-4
 - confidence limit, 78-2
- Upstream control, 19-21
- Urban
 - area, 73-3
 - interchange, 73-25
 - roadway, 73-3
 - street, 73-3, 73-14
 - survey, 78-5
- Urea, 32-10 (ftn), 34-19 (ftn)
 - carbamide, 32-10
- Usage, electrical, 84-7
- USCS, 35-4, 35-6 (tbl)
 - symbols, A-106, A-107
- Use, critical, halon, 32-6
- Useful life, 87-20 (ftn)
- USSWG wire, 67-7
- UST, 32-15
- UTC, G-15
- Utility, 75-10
 - airport, 79-21
- Utilization factor, 73-28
- UU test, 35-28

- V**
- V-belt, 72-7
- V-notch weir, 19-13
- Vacuole, 27-2
- Vacuum, 14-3
 - drum filter, 30-18
 - extraction, 34-22
 - sewer system, 28-4
 - valve, 16-14
- Vadose
 - water, G-15
 - zone, 21-1, G-15
- Valence, 22-1, G-15
- Value (*see also type*)
 - alpha-, 85-5
 - analysis, 87-44
 - average (by integration), 9-4, 87-30
 - book, 87-23
 - boundary, 10-1
 - characteristic, 4-8
 - effective, 84-4
 - engineering, 86-2, 87-44
 - excess, 75-17
 - expected, 11-8, 78-2, 87-30
 - face, 87-29
 - heating, 24-14
 - influence, 40-2
 - initial, 9-4, 10-1
 - instantaneous, 71-2
 - limiting, 3-9
 - market, 87-23
 - most likely, 78-2
 - nominal, 50-4
 - of money, time, 87-5
 - of z , 11-15 (tbl)
 - present, 87-5 (ftn)
 - probable, 78-2
 - R -, 35-32
 - residual, 86-7, 87-16
 - resistance, soil, 35-31
 - root-mean-squared, 11-12
 - salvage, 87-18
 - stabilometer, 76-14
 - standard normal, 11-6, 11-12
 - terminal, 87-16
- Valve, 16-12
 - air release, 16-12
 - air, siphon, 16-14
 - altitude, 26-24, 26-25
 - angle, 16-12
 - angle lift, 16-12
 - antireversal, 16-12
 - ball, 16-12
 - butterfly, 16-12
 - characteristics, 16-13
 - check, 16-12
 - combination air, 16-14
 - diagram, 16-13 (tbl)
 - double orifice air, 16-14
 - eccentric plug, 16-12
 - equivalent length, A-56
 - flow coefficient, 17-13
 - gate, 16-12
 - globe, 16-12
 - lift, 16-12
 - make-or-break, 16-14
 - needle, 16-12
 - nonreverse flow, 16-12
 - plug, 16-12
 - plug cock, 16-12
 - pressure-relief, 17-39
 - relief, 16-12
 - safety, 16-12
 - safety relief, 16-12
 - safety, full-lift, 16-12
 - safety, high-lift, 16-12
 - safety, low-lift, 16-12
 - shutoff service, 16-12
 - slow-closing, 17-39
 - swing, 16-12
 - throttling service, 16-12
 - type, 16-13 (fig)
 - vacuum, 16-14
 - Y-, 16-12
- Vane, 17-35
 - shear apparatus, 35-29
 - shear test, 35-29
- Vapor
 - condensing, 34-22
 - incinerator, 34-15
 - pressure, 14-9
 - pressure head, 18-6
 - pressure, Reid, 32-8
- Variable, 3-2
 - area meter, 17-27
 - capacitance transducer, 85-4
 - cost, 86-9, 87-32
 - dependent, 3-2
 - dimension of, 1-8 (tbl)
 - independent, 3-2
 - inductance transducer, 85-4
 - matrix, 4-6
 - reluctance transducer, 85-4
 - resistor, 85-3
 - sensitivity, 87-44
 - slope method, 20-8
 - standard normal, 11-12
- Variance
 - account, 87-36
 - burden, 87-36
 - sample, 11-13
- Variate, standard normal, 11-12
- Variation
 - coefficient of, 11-13
 - in water demand, 26-22
 - magnetic, 78-12
 - Manning's constant, 19-5
 - of parameters, 10-4
 - seasonal, 38-3
 - wastewater flow, 28-2 (tbl)
- Varied flow, 19-21, G-15
- Varignon's theorem, 41-3
- Varve, G-15
- Varved clay, 40-4
- Varying
 - mass, 72-19
 - n -value, 19-5
- Vaulting, 75-13
- VBI, 14-16
- VBN, 14-16
- Vector, 5-1
 - addition, 5-3
 - biological, 31-5
 - bound, 5-1 (ftn)
 - Cartesian unit, 5-2
 - characteristic, 4-8
 - cross product, 5-4 (fig)
 - dot product, 5-3 (fig)
 - equal, 5-1
 - equivalent, 5-1 (ftn)
 - field, curl, 8-7
 - field, divergence, 8-7
 - fixed, 5-1 (ftn)
 - function, 5-5
 - gradient, 8-5
 - image, 78-7
 - in two-dimensional space, 5-1 (fig)
 - inertia, 70-2, 72-5 (ftn)
 - load, 47-12
 - multiplication, 5-3
 - normal line, 8-6
 - normal to plane, 7-6
 - orthogonal, 5-3
 - phasor form, 5-2
 - polar form, 5-2
 - position, 41-3
 - rectangular form, 5-2
 - resultant, 5-3
 - sliding, 5-1 (ftn)
 - threshold, 31-5
 - transmissible, 5-1 (ftn)
 - triple product, 5-5
 - unit, 5-2, 41-2
- Vehicle
 - design, 73-3
 - dynamics, 75-2
 - equivalent, 73-7
 - escort, 74-3
 - factor, 75-8
 - high-occupancy, 73-7
 - image size, relative, 75-9 (fig)
 - impact modeling, 75-13
 - period, 73-20
 - pilot, 74-3
 - recreation, 73-7
 - shadow, 73-32
 - standard design, 76-18
 - type, 73-7
- Vehicular volume warrant,
 - signalization, 73-18
- Veil, corporate, piercing, 88-3
- Velocity, 71-3
 - absolute, 71-10
 - acoustic, 14-14
 - actual filtering, 34-6
 - angular, 71-7
 - apparent, 21-4
 - areal, 72-20
 - average, 16-8
 - bulk, 16-8
 - burnout, 72-19
 - centerline, 16-8
 - coefficient of, 17-17, 17-29
 - conversion, SI, A-3, A-5
 - critical, 19-18, 26-6, G-5
 - critical settling, 26-7
 - critical, sludge, 18-5, 18-6
 - Darcian, 21-4
 - Darcy, 21-4
 - dependent force, 72-18
 - design filtering, 34-5
 - difference, relative, 17-35

- discharge, 21-4
 distribution, 16-7, 16-8 (fig), 19-2
 distribution, laminar, 16-8 (fig)
 distribution, turbulent, 16-8 (fig)
 drift, 34-8, 34-9
 effective, 21-4
 effective drift, 34-9
 energy, 16-1 (ftn)
 equivalent, 21-3
 escape, 72-21
 face, 34-5
 filtering, 34-5
 flooding, 34-2
 flow front, 21-4
 flow-through, 26-5
 gradient, 14-6, 17-14, 26-11
 gross filtering, 34-5
 Hazen-Williams, 19-6
 head, 18-6
 jet, 17-17
 lifting, water, 21-5
 linear, 21-4
 maximum, erodible channel, 19-26
 maximum, fluid, 17-3
 maximum, open channel, 19-26
 mean, open channel, 19-2
 migration, 34-9
 minimum, open channel, 19-2
 mixing, 26-11
 net filtering, 34-5
 net net filtering, 34-5
 of approach, 16-4, 17-16, 17-17, 17-31
 of approach factor, 17-29
 of whirl, 18-11 (ftn)
 overland flow, 20-5
 paddle, relative, 26-11
 pore, 21-4
 potential function, 17-3
 profile, 16-8
 ratio, pump, 18-3 (tbl)
 reaction, 22-13
 rebound, 72-17
 relative, 71-10
 scouring, 29-6
 seepage, 21-4
 self-cleansing, 19-2, 20-3 (ftn), 28-4
 settling, 17-43, 26-5, 26-6
 sewer, 28-4
 sonic, 14-14
 superficial, 21-4
 superficial face, 34-5
 tangential, 18-22, 71-8
 terminal, 17-43, 72-19
 unit, 21-3
 wave, 19-18
- Velz**
 decay rate, 29-11
 equation, 29-11
- Vena contracta**, 17-17, 17-30 (ftn)
- Veneer failure**, 31-5
- Venn diagram**, 11-1 (fig)
- Venturi**
 discharge coefficients, 17-30 (fig)
 effect, 17-29
 meter, 17-29, 17-30 (fig)
 meter performance, 17-29
 scrubber, 34-18
 scrubber collection efficiency, 34-19
- Vers function**, 6-4
- Versed**
 cosine, 6-4
 sine, 6-4
- Versine**, 6-4
- Vertex**
 angle, 6-1
 parabola, 7-10
- Vertical**
 angle, 6-2
 buckling, 44-19
 curve, 79-11
 curve, obstruction, 79-13 (fig)
 curve, railway, 79-22
- curve, symmetrical parabolic, 79-12 (fig)
 curve, through point, 79-13, 79-14
 curve, unequal tangent, 79-17
 curve, unsymmetrical, 79-17
 dilution of position, 78-6
 exaggeration, 78-21
 -lagging cofferdam, 39-8
 lift bridge, 57-4
 multiplier, 83-7, 83-8
 plane surface, hydrostatic pressure
 on, 15-7 (fig)
 point, 78-19
 soil pressure, 37-3
- Vesic factor**, 36-3, 36-4 (tbl)
- VFA**, 76-9
- requirement, 76-16 (tbl)
- Vibration**, concrete, 49-5
- Vibratory roller**, 76-8
- VIC**, 32-16
- Vicat softening point**, 43-11
- Vickers test**, 43-13
- View**
 auxiliary, 2-2
 axonometric, 2-3
 central, 2-1
 dimetric, 2-3
 frontal auxiliary, 2-2
 horizontal auxiliary, 2-2
 isometric, 2-3
 normal, 2-1
 oblique, 2-2
 orthogonal, 2-1
 orthographic, 2-1, 2-2
 orthographic oblique, 2-3
 perspective, 2-1, 2-3
 plan, 2-2
 planar, 2-2
 principal, 2-2
 profile auxiliary, 2-2
 redundant, 2-2
 trimetric, 2-3
 type, 2-1
- Viewer, takeoff**, 86-3
- Virgin**
 compression branch, 40-4
 compression line, 35-24
 consolidation line, 35-24
 curve, 40-4
- Virtual**
 displacement, 46-10
 work, 46-10
 work method, 44-18
 work method, beams, 47-17
 work principle, 47-3
- Virus**, 27-4, 27-6
- Viscometer**
 concentric cylinder, 14-6 (ftn)
 cup-and-bob, 14-6 (ftn)
 Saybolt, 14-6 (ftn)
 test, 14-6
- Viscosity**, 14-6
 absolute, 14-6 (ftn)
 Bingham-plastic limiting, 17-12
 blending index, 14-16
 blending number, 14-16
 coefficient of, 14-6
 conversion, 14-8, 14-9 (tbl), A-3, A-5
 dynamic, 14-6 (ftn)
 effect on head loss, 17-11
 fuel, A-24
 grade, 14-9
 grading, 76-2
 heat transfer fluid, A-24
 hydrocarbon, A-24
 index, 14-9
 kinematic, 14-8, 16-7
 lubricant, A-24
 Newton's law of, 14-6, 14-7
 non-Newtonian, 17-12
 power law, 17-12
 water, A-20
- Viscous**
 coefficient, 72-19
 damping, coefficient of, 72-19
 drag, 72-18
 flow, 16-7
- Vision**, 75-9
 center of, 2-3
 peripheral, 75-9
- Visit, site**, 86-3
- Visual**
 acuity, 75-9
 depth, 75-9
 -optical process, 43-12
 search, 75-9
- Vitrification**, 34-4, 34-22, G-15
- Vitrified clay pipe**, 16-9, 28-4
- VMA**, 76-9
 criterion, mix design, 76-13 (fig)
 requirement, 76-16 (tbl)
- VOC**, 28-14, 32-14, 32-15, 32-16
- Void**
 air, 76-9
 filled with asphalt, 76-9
 mineral aggregate, 76-9
 ratio, 21-2, 35-7
 region, 7-3
 total air, 76-9
 total mix, 76-9
- Volatile**
 acid, 27-9
 dissolved solids, 25-9
 inorganic compound, 32-16
 liquid, 14-10, 22-11 (ftn)
 matter, 24-4
 organic chemical, 28-14
 organic compound, 28-14, 32-14, 32-15,
 32-16, G-15
 solids, 25-9, 28-6, 30-4, G-15
 suspended solids, 25-9
 suspended solids concentration, 30-5
- Volatility**, 24-6
- Volatilization**, G-15
- Volcanic glass**, 35-32
- Voltage**, 84-2
 deflection, 85-10
 divider, 84-4
 drop, 84-3
 induced, 17-27
 motor, 84-17
 regulation, 84-11, 84-12
- Voltammeteric sensor**, 85-3
- Volume**
 absolute, 49-2
 -capacity ratio, 73-5, 73-15
 consolidated, 49-2
 conversion, A-3, A-5
 directional design hour, 73-5
 flow conversion, A-3, A-6
 hourly, 73-9
 index, sludge, 30-5
 mensuration, A-9
 mensuration, three-dimensional, A-9
 molar, 22-5
 of a fluid, 14-1
 of revolution, 9-5, 9-6, 42-3 (fig)
 parameter, traffic, 73-4
 pile, 80-4
 reactor, 30-7, 30-8
 settled sludge, 30-6
 sludge, 30-10, 30-12
 sludge, water treatment, 26-12
 solid, 49-2
 specific, 14-4
 warrant, signalization, 73-18
 wastewater, 28-1, 28-2
- Volumetric**
 air flow rate, 30-10
 analysis, 24-2
 efficiency, pump, 18-3
 expansion, coefficient, 44-4
 flow rate, 17-3

- fraction, 24-2
 - loading, 30-8
 - strain, 14-14
 - Von Mises theory, 43-8
 - Vortex double, 34-7
 - Vorticity, 8-7
 - VTM, 76-9
- W**
- W**
 - beam guardrail, 75-13
 - shape, 61-1
 - shape beam, 59-2 (fig)
 - W&M wire gauge, 67-7
 - WAAS, 78-6
 - Waffle slab, 51-5
 - Wah gas, G-15
 - Waiting
 - line, 73-27
 - time, 73-27
 - Wake, drag, 17-41
 - Wale, G-15
 - Walkway, 73-21
 - width, effective, 73-21
 - Wall
 - bearing, 54-2
 - buttress, 37-1
 - cantilever, 39-4
 - cell, G-4
 - concrete, 54-1
 - containment, 40-10
 - counterfort, 37-1
 - cut-off, 40-10
 - effective length factor, 54-2
 - footing, 36-2, 55-2
 - friction angle, 37-5
 - friction, soil, 37-3
 - gabion, 37-2
 - gravity, 37-1
 - load-carrying, 54-2
 - masonry, 68-1, A-153, A-154, A-155, A-156
 - multiple wythe, 68-14
 - nonbearing, 54-1
 - retaining, 54-1, 54-2
 - retaining, active
 - components, A-108, A-109
 - retaining, analysis, 37-9
 - retaining, cantilever, 37-1, 39-4
 - retaining, design, 37-12
 - semi-gravity, 37-1
 - shear, 54-2
 - shear stress factor, 17-5 (ftn)
 - shear, cantilever, 39-5 (fig)
 - slurry, 40-10
 - tie, 68-14
 - wiper, 34-20
 - Warming, global, 32-8
 - Warning area, advanced, 73-31
 - Warping, constant, 59-3, 59-4
 - Warrant, signal (*see also type*), 73-17
 - WAS, 30-2, 30-14
 - Washboarding, pavement, 76-5
 - Washburn and Moen wire gauge, 67-7
 - Washer
 - direct tension indicator, 58-4
 - material, 58-4
 - Washing, soil, 34-20
 - Washout
 - sludge, 30-13
 - solids, 30-13
 - toe, 39-5
 - Wastage rate, 30-8
 - Waste (*see also type*), 32-2
 - activated sludge, 30-2, 30-14
 - autogenous, 34-11 (ftn)
 - decomposition, 27-9
 - decomposition, end product, 27-10 (tbl)
 - domestic, G-5
 - extrinsic, 32-2
 - fuel, 24-4
 - intrinsic, 32-2
 - K-, 32-2
 - municipal solid, 31-1
 - overautogenous, 34-11 (ftn)
 - P-, 32-2
 - subautogenous, 34-11 (ftn)
 - to-energy facility, 31-10
 - to-steam plant, 31-10
 - U-, 32-2
 - Wastewater, 34-22
 - characteristics, 28-6
 - compositing, 28-15
 - domestic, 28-1
 - industrial, 28-2, 28-8, 29-1
 - municipal, 28-2
 - peaking factors, 28-2
 - pump, 29-3
 - pump installation, 18-5 (fig)
 - quantity, 28-1, 28-2
 - reclamation, 29-13
 - sanitary, 28-1
 - sludge quantity, 30-13
 - standard, 28-15
 - standards, industrial, 29-1
 - tests, 28-8
 - treatment, 34-22
 - treatment plant, 29-3
 - volume, 28-1, 28-2
 - Wasteway, G-15
 - Wasting, 22-24 (ftn)
 - sludge, 30-12
 - Water
 - absorbed, G-1
 - absorption, masonry, 67-5
 - balance equation, 20-2
 - balance, post-closure, 31-7
 - brake, 85-13
 - budget equation, 20-2
 - bulk modulus, 14-14
 - CaCO₃ equivalents, A-85, A-86
 - capillary, G-4
 - cement ratio, 49-2, 77-2 (tbl), 77-3 (tbl)
 - cementitious materials ratio, 49-2
 - chemistry, CaCO₃
 - equivalents, A-85, A-86
 - conductivity, 26-19
 - confined, G-5
 - connate, G-5
 - content, 21-2, 35-7
 - content, optimum, 35-18
 - deionized, 22-24
 - demand, 26-22
 - demand multiplier, 26-22
 - demineralized, 22-24
 - distribution, 26-24
 - flow, steel pipes, 17-9, A-55
 - gas, 24-8 (ftn)
 - gravitational, G-7
 - hammer, 17-38 (fig)
 - hammer, wave speed, 17-38
 - hard, G-7
 - hardness, 22-21, 25-3, 25-4
 - hardness ions, 25-4
 - horsepower, 17-15, 18-8
 - hygroscopic, G-8
 - in concrete, 48-3
 - juvenile, G-9
 - lifting velocity, 21-5
 - make-up, 22-23
 - meteoric, G-9
 - nonpotable, 27-4
 - of crystallization, 22-5
 - of hydration, 22-5
 - oxygen, dissolved, A-87
 - pipe (*see also type*), 26-25
 - pipe, Hazen-Williams, A-50
 - pipe, PVC, dimensions, A-39, A-40, A-41
 - pipe, roughness, A-50
 - power, 18-7
 - pressure, 26-25
 - pressure drop, steel pipe, A-55
 - properties, 49-1, A-16, A-17, A-18, A-19
 - quality compartment, 32-14
 - reducer, high-range, 48-3
 - reducing admixture, 48-3
 - softening, 26-16
 - softening equivalents, A-85, A-86
 - stability, 26-18
 - storage, 26-24
 - subsurface, 21-1
 - supply chemistry, 22-20
 - supply demand, 26-22
 - supply treatment method, 26-4 (tbl)
 - table, 40-5, G-15
 - table, bearing capacity, 36-8
 - table, retaining wall, 37-9
 - treatment chemical application
 - point, 26-3 (tbl)
 - treatment chemicals, A-103
 - treatment plant location, 26-2
 - tubing, copper, dimensions, A-47
 - unaccounted for, 26-25
 - underground, 21-1
 - Vadose, G-15
 - vapor, 32-16
 - viscosity, A-20
 - Waterborne disease, 27-10
 - Watercourse, natural, 19-10
 - Watershed
 - detention, 20-19
 - modeling, 20-23
 - retention, 20-19
 - Watery mixture, 48-4
 - Watt, 1-5, 18-9 (ftn)
 - Wave
 - formula, kinematic, 20-4
 - speed, water hammer, 17-38
 - standing, 19-18, G-13
 - surface, 19-18
 - surge, 19-18
 - velocity, 19-18
 - Waveform
 - Fourier, 9-7
 - frequency, 9-7
 - period, 9-7
 - periodic, 9-7
 - symmetrical, 9-7 (tbl)
 - Waviness
 - height, 2-4
 - spacing rating, 2-4
 - width rating, 2-4
 - Waving the rod, G-15
 - Way traveled, G-14
 - Weak
 - axis, 59-2, 59-5
 - material, 43-1
 - Weakened
 - base, pole, 75-13
 - plane joint, 77-11
 - Weather cold, 49-6
 - Weathering
 - grade, 67-5
 - steel, 58-6 (ftn)
 - steel design, 58-6
 - Weave
 - one-sided, major, 73-26
 - segment, major, 73-26
 - Weaving, 73-26
 - area, 73-26
 - base length, 73-26
 - movement, 73-26
 - one-sided, ramp, 73-26
 - section, two-sided, single-lane
 - ramp, 73-26
 - segment configuration, 73-26
 - segment length, 73-26 (fig)
 - segment width, 73-26
 - segment, freeway, 73-26 (fig)
 - segment, one-sided, 73-26, 73-27 (fig)
 - segment, two-sided, 73-26, 73-27 (fig)
 - short length, 73-26
 - Web, 42-4
 - cripping, 44-19, 59-17
 - depth, 63-1

- flanged beam, 44-10 (fig)
force, concentrated, 59-17
plastification factor, 63-6, 63-7
plate buckling coefficient, 63-2
plate girder, 63-2
stiffener, 44-19
yielding, 59-17
yielding calculation,
nomenclature, 59-18 (fig)
- Weber
number, 1-9 (tbl), 17-47 (ftn)
number, similarity, 17-47 (tbl)
- Webster's equation, traffic signal, 73-16
- Wedge, 72-7
pile, 80-4 (fig)
usage, 72-7 (fig)
- Weight, 1-1, 1-3, 22-6, 70-1
adjusted, 49-3
and proportion problem, 22-8, 27-11
atomic, 22-2, A-83, G-2
chemical, atomic, 22-2, A-83, G-2
combining, 22-6
density, 1-3
density, concrete, 48-4
equivalent, 22-5, G-6
formula, 22-5
limit sign, 74-2 (fig)
limit, lifting, 83-7
molecular, 22-5, G-10
roughness, 2-4
specific, 14-5
specific, concrete, 48-4
unit, 14-5, 35-7
unit, concrete, 48-4
-volume relationship, 76-6
-volume relationship, asphalt
mixture, 76-7 (fig)
- Weighted
average cost, 87-31
cost, 87-31
- Weighting
agent, 26-9
factor, 87-31
- Weir, 19-10
broad-crested, 19-13
Cipoletti, 19-13
contracted, 19-11
equation, Francis, 19-11
equation, Rehbock, 19-11
length, 19-11
loading, 26-6, 29-7
loading rate, 29-7
proportional, 19-14
rectangular, submerged, 19-11
sharp-crested, 19-11
suppressed, 19-11
Sutro, 19-14
trapezoidal, 19-13
triangular, 19-13
V-notch, 19-13
- Weisbach equation, 17-6, 17-7
- Weld, 66-1
as lines, A-125
balanced tension, 66-4
CJP, 66-2
complete-penetration groove, 66-2, 66-8
decay, 22-19
ductility, 66-4
electrode, 66-2
electroslag, 66-2
fillet, 45-14, 66-2, 66-3 (fig), 66-9
flux-cored arc, 66-2
full-penetration groove, 66-2
gas metal arc, 66-2
groove, 66-2, 66-8
group, A-125
group, balanced, 66-4
group, properties, A-125
metal, 66-1
metal active gas, 66-2
metal inert gas, 66-2
minimum effective size, 66-9 (tbl)
partial-penetration groove, 66-2, 66-9
PJP, 66-2
plug, 66-2
shielded metal arc, 66-1
size, 66-3 (tbl)
size, minimum, 66-9
slot, 6-2, 66-2
strength, bridge, 66-8
submerged arc, 66-1
symbol, 66-3 (fig)
throat, 66-2
throat, effective, 45-14
type, 66-2 (fig)
- Weldability, 58-2
- Welded
connection, AASHTO *LRFD*, 66-8
connection, building frame, 66-8
connection, combined shear and
bending, 66-5 (fig)
connection, combined shear and
torsion, 66-5 (fig)
joint, type, 66-2 (fig)
- Welding (*see also* Weld), 66-2
filler metal, material, 58-4
- Well, 21-4
artesian, 21-2
chlorine dose, 21-4
deep, 80-11
developed, 21-4
drawdown, 21-5
extraction, gas, 31-6
flowing, G-6
function, 21-7
-graded soil, 35-2
gravel pack, 21-4
gravity, 21-2, 21-4
injection, 34-11
monitor, 21-4, 31-9
observation, G-10
penetrating, 80-11
pumping power, 21-7
relief, 21-4
screen, 21-4
sterilization, 21-4
symbols, A-106, A-107
wet, G-15
- Wellpoint, 80-11
- West declination, 78-12
- Westergaard
case, 40-2
modulus of subgrade reaction, 77-5
- Western coal, 24-5
- Wet
basis, concrete, 49-3
condition, 72-6
density, 35-7
scrubber, 34-2
venturi scrubber, 34-18 (fig)
well, G-15
- Wetted perimeter, 16-5, A-30, G-15
- Weymouth formula, 17-10
- Wheatstone bridge, 85-9
- Wheelbarrow, 80-9
- Wheelbase, 73-3
- Whirl, velocity of, 18-11 (ftn)
- Whistle-blowing, 89-3 (ftn)
- Whitening, 76-29
ultra-thin, 76-29
- Whitney assumption, 50-8
- Wide
area augmentation system, 78-6
beam, 44-17
-beam shear, 55-3
- Width, 2-2
beam, minimum, 50-8 (tbl)
effective, 19-11, 50-18, 64-2
effective flange, AASHTO, 57-2
effective slab, composite member, 57-2
stall, 73-21
-thickness ratio, 61-6, 61-7 (tbl), 63-3
tolerance, universal mill plate, 58-3 (tbl)
- trench, transition, 40-9
weaving segment, 73-26
- Wind tunnel, 17-42
- Windage loss, 84-17
- Window sliding, method, 75-17
- Winfrey method, 87-16 (ftn)
- Wiper, wall, 34-20
- Wire
corona, 34-8
fiber core, 45-21
gauge, masonry, 67-7
horizontal joint, 67-7
independent core, 45-21
lap length, 67-7
reinforcing, A-134
rope, 45-21, 45-22
rope, hoisting, 83-10
sheave, 45-22
size, AWG, 84-8
spiral, column, 52-3
strand core, 45-21
-to-water efficiency, 18-9
- Witness stake, 81-1
measurement, 81-1
- Wood as fuel, 24-4
- Work, 13-2, 47-3
done by force, 13-2
done by torque, 13-2
-energy principle, 13-3, 13-4, 45-20
external, 13-2
flow, 13-3
internal, 13-2, 43-6
lost, 17-4 (ftn)
of a constant force, 13-2 (fig)
p-V, 13-3, 13-4
performed by a force, 9-4
space, traffic, 73-32
spring, 13-2
virtual, 46-10
virtual, method, 44-18
- Workability
concrete, 48-4, 49-1
pavement, 76-5
- Working
arm, 83-10
stress design, 58-5
stress design method, 45-2
- Worksheet, moment distribution, A-133
- Worm, 27-8
- Worth
future, 87-5
method, present, 87-14, 87-15
present, 87-5
- Woven fabric, 40-10
- Wye-connection, 84-11
- Wythe, 68-14
multiple, 68-14
- Wöhler curve, 43-9
- X
- X-ray testing, 43-12
- Xeriscape, G-15
- Xerophytes, G-15
- Y
- Y
-connection, 84-5
-valve, 16-12
- Yard
bank cubic, 80-1
compacted cubic, 80-1
cubic, 80-1
loose cubic, 80-1
-quarter, 80-9
-station, 80-8
- Yaw, 17-27, 72-2
angle, 17-28
- Year-end convention, 87-3

Yield, 22-9, 49-2, 87-28
 biomass, 30-13
 bond, 87-30
 cell, 30-13
 coefficient, 27-11, 30-7, 30-13
 coefficient, maximum, 28-6
 factor, 27-12
 linear, paving, 76-7
 mass, 31-11
 observed, 30-8
 point, 43-3, 58-2
 reservoir, 20-19
 safe, 21-6, G-12
 sludge, 30-13
 specific, 21-3, G-13
 strength, 43-3, 58-2
 strength, lower, 43-3
 strength, representative
 material, 43-3 (tbl)
 strength, upper and lower, 43-3 (fig)
 stress, 17-12, 43-3, 58-2
Yielding, web, 59-17
Young's modulus, 43-2, 44-2, 48-5
Yuba Power, Greenman versus, 88-7 (ftn)

Z

z-values for confidence level, 11-15 (tbl)
Zebra mussel, 27-8
Zeolite, 22-22
 process, 22-22, 26-17
 synthetic, 26-17
Zero, 3-3, 12-1
 air voids curve, 35-18
 air voids density, 35-18
 -discharge facility, 32-6
 factorial, 3-2 (tbl)
 -force member, 41-14 (fig)
 haulage line, 80-6
 -indicating bridge, 85-9 (ftn)
 matrix, 4-2
 -order, reaction rate, 22-14
 -solids treatment, 22-24
 -voids density, 35-8
Zone (*see also type*)
 active, 37-3
 benthic, G-3
 clear, 75-13
 of aeration, G-15
 of influence, 40-2
 of saturation, G-15
 phreatic, 21-1, G-11
 vadose, 21-1, G-15
Zoned survey, 78-5
Zoning, ordinance, 82-2
Zoogloea, G-15
Zooplankton, G-15
Zuber equation, 14-11
 Z_x beam selection table, 59-8