

# Index

| <u>Index terms</u>                   | <u>Links</u> |       |      |
|--------------------------------------|--------------|-------|------|
| <b>A</b>                             |              |       |      |
| Absolute tolerances                  | 27.13        | 27.16 |      |
| gap                                  | 27.13        |       |      |
| (examples)                           | 27.14        |       |      |
| worksheet                            | 27.16        |       |      |
| Absolute viscosity                   | 20.6         |       |      |
| Acceleration:                        |              |       |      |
| geometric                            | 4.4          |       |      |
| modified trapezoidal                 | 4.11         |       |      |
| Acme thread in power screws          | 13.3         | 13.4  |      |
| standard thread sizes (table)        | 13.5         |       |      |
| Actuating torque in power screws     | 13.6         |       |      |
| Actuators, linear                    | 2.5          |       |      |
| ADAMS                                | 3.22         |       |      |
| Addition method of Crafts and Lamont | 33.9         |       |      |
| Additives, extreme pressure (EP)     | 20.11        |       |      |
| Addresses, AGMA                      | 10.1         |       |      |
| Addendum                             | 9.3          | 10.6  | 11.2 |
| Adequacy assessment                  | 28.4         |       |      |
| Adjustable-stroke mechanism          | 2.7          |       |      |
| Adjustment, fine (illustration)      | 2.6          | 2.7   |      |
| Adsorption                           | 20.9         |       |      |

| <b><u>Index terms</u></b>                                  | <b><u>Links</u></b> |       |
|--|---------------------|-------|
| AGMA (American Gear Manufacturer's Association)            | 9.6                 | 11.25 |
| address of   | 11.25               |       |
| standards of   | 10.1                |       |
| AGMA rating equations for wear for spur gears:             |                     |       |
| for allowable contact stress                               | 9.8                 |       |
| for pitting resistance                                     | 9.8                 |       |
| for pitting resistance power rating                        | 9.10                |       |
| AGMA rating equations for bending strength for spur gears: |                     |       |
| for allowable bending stress                               | 9.11                |       |
| for bending strength power rating                          | 9.11                |       |
| AISC (American Institute of Steel Construction):           |                     |       |
| fatigue allowables   | 26.42               |       |
| Allowable stress levels                                    | 26.40               |       |
| Allowable stresses in bolts (table)                        | 22.8                |       |
| Alloy designations for steels                              | 32.53               |       |
| Alloy increments   | 33.10               |       |
| boron  | 33.13               | 33.16 |
| chromium   | 33.25               |       |
| manganese  | 33.14               |       |
| molybdenum   | 33.16               |       |
| nickel   | 33.25               |       |
| silicon  | 33.14               |       |
| Amorphous solids   | 32.6                |       |
| Analysis, ladle  | 33.9                |       |
| Analysis of frames:  |                     |       |
| Castigliano's theorem in analysis of frames                | 37.3                | 37.14 |
| (example)  | 37.14               |       |
| Castigliano's theorem with redundant members               | 37.17               |       |
| (example)  | 37.17               |       |
| Angle of twist   | 36.8                |       |

| <b><u>Index terms</u></b>                         |       | <b><u>Links</u></b> |
|---|-------|---------------------|
| Angles, structural                                | A.19  |                     |
| Angular deflections of sections (table)           | 36.9  |                     |
| Angular fluctuations in flywheels                 | 7.7   |                     |
| (example)   | 7.8   |                     |
| Annealing   | 32.22 |                     |
| Anode in welding                                  | 26.4  |                     |
| Anodic protection                                 | 35.5  |                     |
| ANSI (American National Standards Institute)      | 15.2  |                     |
| Application factor in rolling-contact bearings    | 18.15 |                     |
| Arc shielding                                     | 26.2  |                     |
| Arc welding:                                      | 26.1  |                     |
| codes and specifications                          | 26.39 |                     |
| commercial processing                             | 26.6  |                     |
| consumables                                       | 26.18 |                     |
| welded joint design                               | 26.23 |                     |
| Area, reduction of                                | 32.37 |                     |
| second moment of                                  | A.11  |                     |
| As-quenched hardness                              | 33.10 |                     |
| ASME (American Society of Mechanical Engineers)   | 3.10  |                     |
| ASTM (American Society for Testing and Materials) | 26.39 |                     |
| rivet specification                               | 24.3  | 24.5                |
| Atkinson mechanism                                | 2.15  |                     |
| Atomic hydrogen process                           | 26.16 |                     |
| Atomic number                                     | 32.4  |                     |
| Atomic structure                                  | 32.6  |                     |
| Atomic weight                                     | 32.4  |                     |
| Attitude angle                                    | 19.17 |                     |
| Autofrettage                                      | 39.15 |                     |
| AWS (American Welding Society)                    |       |                     |
| specifications                                    | 26.19 |                     |

**Index terms****Links**

Axes:

possible, in crystal 32.11

principal A.14

Axial clutch (figure) 8.6

**B**

Back hoe 2.23

Backlash 9.3 11.2

Backup strips 26.35

Baking 6.4

Balancing (figure) 3.21

Ball bearings (*See* Rolling-contact bearings)

Ball joints 2.3

Ball screws 13.3

sizes and capacities (table) 13.11

Band brake 8.9 8.34

Base:

circle 9.4

pitch 9.5 10.6

Basic:

load rating 18.9

size 27.2

size ranges, IT grades 27.4

Basic arc welding circuit 26.2

Basic static load rating in rolling-contact bearings 18.8

Beam column analysis 30.12

Beam springs 6.57

Beams:

tables of properties 37.4

**Index terms****Links**

## Bearing:

|                  |       |
|------------------|-------|
| alloys (table)   | 19.10 |
| area (figure)    | 22.11 |
| journal          | 19.3  |
| lengths          | 19.20 |
| load (s)         | 19.17 |
| range of (table) | 19.17 |
| materials        | 19.8  |
| reliability goal | 18.11 |
| selection        | 18.10 |
| stress           | 22.11 |
| in joints        | 22.7  |
| types (figure)   | 19.5  |
| whirl            | 19.45 |

## Bearings:

|                    |       |
|--------------------|-------|
| ball               | 18.4  |
| design charts      | 19.23 |
| flow relations     | 19.27 |
| friction relations | 19.27 |
| load relations     | 19.16 |
| long and short     | 19.20 |
| notation           | 19.3  |
| roller             | 18.4  |
| stability chart    | 19.46 |
| step wise loading  | 18.15 |
| thermal conditions | 19.19 |
| types              | 19.4  |

## Bell crank

3.1

## Belleville washers

6.40 24.26

## Belt:

|           |      |
|-----------|------|
| couplings | 2.18 |
|-----------|------|

**Index terms****Links**Belt: *(Continued)*

|  |       |       |
|--|-------|-------|
| materials  | 14.17 | 14.19 |
| rivet  | 24.3  |       |
| Belt drives:   |       |       |
| comparison   | 14.39 |       |
| flat belt  | 14.16 |       |
| flexible connectors  | 14.4  |       |
| other  | 14.27 |       |
| V-belt   | 14.21 |       |
| Bending deflection of shafts by tabular method<br>(tables) | 17.5  | 17.7  |
| Bending formula  | 36.15 |       |
| Bending of curved bars in the plane of curvature           | 38.2  |       |
| Bending stress in threads                                  | 13.6  |       |
| Bent washers   | 24.26 |       |
| Bevel and hypoid gears:                                    |       |       |
| computer-aided design                                      | 11.55 |       |
| design considerations                                      | 11.9  |       |
| design and mounting  | 11.50 |       |
| manufacturing  | 11.7  |       |
| tooth dimensions   | 11.19 |       |
| tooth strength   | 11.25 |       |
| Biaxial stress   | 36.3  |       |
| Biezeno theorem  | 38.12 |       |
| Bifurcated rivet   | 24.3  |       |
| Blind rivet  | 24.3  |       |
| Body-centered cubic lattice (BCC)                          | 32.12 |       |
| Boiler rivet   | 24.3  |       |
| Bolt:  |       |       |
| grades   | 22.8  | 22.24 |

**Index terms****Links**

|                                     |       |       |
|-------------------------------------|-------|-------|
| Bolt: <i>(Continued)</i>            |       |       |
| heater                              | 22.29 |       |
| preload                             | 22.29 |       |
| specifications                      | 22.34 |       |
| Bolted connection, statistical data | 22.25 |       |
| Bolt stresses                       | 22.15 |       |
| due to combined forces              | 22.17 |       |
| due to primary shear force          | 22.15 |       |
| due to secondary shear force        | 22.16 |       |
| Bolt torque requirement             | 22.41 |       |
| selecting correct torque            | 22.31 |       |
| Bolts                               | 23.5  |       |
| carriage:                           |       |       |
| dimensions                          | 23.12 |       |
| (table)                             | 23.13 |       |
| finished hex bolt:                  |       |       |
| basic dimensions (table)            | 23.14 |       |
| grade markings:                     |       |       |
| ASTM (table)                        | 23.9  |       |
| SAE (table)                         | 23.8  |       |
| metric (table)                      | 23.10 |       |
| heavy structural hex bolt:          |       |       |
| (table)                             | 23.7  |       |
| metric hex:                         |       |       |
| head dimensions (table)             | 23.7  |       |
| thread length                       | 23.6  |       |
| round head:                         |       |       |
| dimensions                          | 23.12 | 23.13 |
| Bonded fluxes                       | 26.12 |       |
| Bonds:                              |       |       |
| covalent                            | 32.5  |       |

**Index terms****Links**Bonds: *(Continued)*

|              |      |
|--------------|------|
| metallic     | 32.5 |
| secondary    | 32.6 |
| van der Waal | 32.6 |

|                     |      |
|---------------------|------|
| Bouncing of springs | 6.23 |
|---------------------|------|

## Boundary:

|                        |       |
|------------------------|-------|
| conditions of bearings | 19.15 |
| lubrication            | 19.5  |

## Brake types:

|                 |      |
|-----------------|------|
| classification  | 8.11 |
| band            | 8.34 |
| caliper         | 8.42 |
| cone            | 8.37 |
| disk            | 8.40 |
| electromagnetic | 8.45 |
| long shoe       | 8.25 |

*(See also Clutches and brakes)*

|              |      |
|--------------|------|
| Brake factor | 8.13 |
|--------------|------|

|                         |      |
|-------------------------|------|
| Brake selection (table) | 8.15 |
|-------------------------|------|

|                              |      |
|------------------------------|------|
| Brake shoes, self-energizing | 8.31 |
|------------------------------|------|

|                            |       |
|----------------------------|-------|
| Brake-in procedure in wear | 34.10 |
|----------------------------|-------|

Brakes *(see Clutches and brakes)*

|                   |       |
|-------------------|-------|
| Breaking strength | 32.36 |
|-------------------|-------|

|                  |       |
|------------------|-------|
| Brinell hardness | 32.24 |
|------------------|-------|

|   |       |
|---|-------|
| quantitatively relating to gear and pinion hardness | 29.33 |
|---|-------|

|                   |      |
|-------------------|------|
| Brittle materials | 28.7 |
|-------------------|------|

|                               |       |
|-------------------------------|-------|
| Buckingham load-stress factor | 29.33 |
|-------------------------------|-------|

## Buckling:

|            |      |
|------------|------|
| of columns | 30.2 |
|------------|------|

|                 |      |
|-----------------|------|
| of power screws | 13.8 |
|-----------------|------|

**Index terms****Links**Buckling: *(Continued)*

|                                  |      |      |
|----------------------------------|------|------|
| of springs                       | 6.20 |      |
| Burmester theory                 | 3.12 |      |
| Butt joint                       | 22.4 |      |
| Buttress threads in power screws | 13.3 | 13.4 |

**C**

Cam characteristics:

|                       |     |
|-----------------------|-----|
| acceleration diagrams | 4.5 |
| dynamic factor        | 4.4 |
| motion equation       | 4.4 |
| planer cam motion     | 4.1 |
| plate cams            | 4.2 |
| spatial cam motion    | 4.1 |
| stiffness             | 4.3 |

Cam layout and design:

|                          |      |
|--------------------------|------|
| cam profile              | 4.17 |
| circular arc cams        | 4.16 |
| constant breadth cams    | 4.16 |
| eccentric cams           | 4.15 |
| finite difference method | 4.22 |
| measurement              | 4.19 |
| undercutting             | 4.17 |

Cam mechanisms:

|                                 |      |
|---------------------------------|------|
| basic cam motions               | 4.5  |
| contact stress and wear         | 4.25 |
| force and torque analysis       | 4.22 |
| layout and design               | 4.17 |
| manufacturing considerations    | 4.17 |
| programming                     | 4.22 |
| types, characteristics, motions | 4.1  |

**Index terms****Links**

|                                       |       |       |
|---------------------------------------|-------|-------|
| Cam motions:                          |       |       |
| miscellaneous                         | 4.15  |       |
| polynomial family                     | 4.14  |       |
| trigonometric family                  | 4.6   |       |
| Cap screw:                            |       |       |
| flat, countersunk head                | 23.13 |       |
| socket, button-head                   | 23.13 |       |
| socket head                           | 23.13 |       |
| Carbon ideal diameter                 | 33.12 |       |
| Carriage bolts:                       |       |       |
| dimensions                            | 23.13 | 23.13 |
| Castigliano's theorem                 | 38.2  |       |
| Cathode in welding                    | 26.4  |       |
| Center of mass                        | A.1   |       |
| Centering mechanism                   | 2.9   |       |
| Centroid, of a bolt group             | 22.13 |       |
| Centroids and center of gravity       | A.1   | A.11  |
| (tables of properties)                | A.3   |       |
| Chain drives:                         |       |       |
| engineering steel chain drives        | 15.18 |       |
| lubrication and wear                  | 15.14 |       |
| roller chain drives                   | 15.4  |       |
| roller chain selection                | 15.7  |       |
| selection of silent chain drives      | 15.27 |       |
| selection offset-sidebar chain drives | 15.20 |       |
| silent chain drives                   | 15.25 |       |
| types, uses, characteristics          | 15.2  |       |
| Channel, American standard            | A.17  |       |
| Charts, stress concentrations         | 28.10 |       |
| Chebychev spacing                     | 3.4   |       |

| <b><u>Index terms</u></b>               | <b><u>Links</u></b> |
|---|---------------------|
| Chinese windlass                        | 2.6                 |
| Chronometer escapements                 | 2.10                |
| Circle diagram, Mohr                    | 36.4                |
| Circuit, welding                        | 26.2                |
| Circuit breaker                         | 2.4                 |
| Clamping mechanisms                     | 2.8                 |
| Clamshell loader                        | 2.23                |
| Clemens coupling                        | 2.19                |
| Clock mechanisms                        | 2.10                |
| Clearance, radial, in a journal bearing | 19.3                |
| Clutches and brakes:                    |                     |
| actuational problems                    | 8.48                |
| band and cone                           | 8.24                |
| electromagnetic                         | 8.45                |
| friction materials                      | 8.23                |
| general                                 | 8.4                 |
| multidisk                               | 8.40                |
| rim type, analysis                      | 8.25                |
| temperature considerations              | 8.21                |
| torque and energy considerations        | 8.14                |
| Clutch types:                           |                     |
| band                                    | 8.34                |
| centrifugal                             | 8.33                |
| cone                                    | 8.37                |
| disk                                    | 8.40                |
| electromagnetic                         | 8.45                |
| list of types                           | 8.4                 |
| magnetic                                | 8.46                |
| Code, for welds                         | 26.39               |
| Coefficient, strength                   | 32.33               |

| <b><u>Index terms</u></b>                              | <b><u>Links</u></b> |       |      |
|--|---------------------|-------|------|
| Coefficient of energy variation in flywheels           | 7.7                 |       |      |
| (example)  | 7.7                 |       |      |
| Coefficient of linear expansion                        | 36.17               |       |      |
| Coefficient of speed fluctuation                       | 7.3                 |       |      |
| (table)  | 7.4                 |       |      |
| Coefficients of variation of strength amplitude:       |                     |       |      |
| for ASME-elliptic fatigue failure locus                | 29.19               |       |      |
| for Gerber fatigue failure locus                       | 29.19               |       |      |
| for Smith-Dolan fatigue failure locus                  | 29.19               |       |      |
| Coldwork   | 32.20               | 32.32 | 33.3 |
| Combined deflection of shafts                          | 17.11               |       |      |
| (table)  | 17.12               |       |      |
| Comparison of belt drives:                             |                     |       |      |
| cost and economy                                       | 14.40               |       |      |
| optimal speeds   | 14.42               |       |      |
| performance  | 14.39               |       |      |
| power-cost curves                                      | 14.41               |       |      |
| properties (table)                                     | 14.40               |       |      |
| specific power transmission capacity                   | 14.40               |       |      |
| Compound cylinders                                     | 39.14               |       |      |
| Compression packing                                    | 21.6                |       |      |
| Compressive stress, definition                         | 36.6                |       |      |
| Computer-aided design in bevel and hypoid gears:       |                     |       |      |
| available computer programs                            | 11.56               |       |      |
| computer time-sharing                                  | 11.55               |       |      |
| design calculating services                            | 11.56               |       |      |
| Computer analysis for slope and deflection in bending: |                     |       |      |
| equation basis   | 37.3                |       |      |
| shaft analysis example                                 | 17.5                |       |      |

| <b><u>Index terms</u></b>                                  | <b><u>Links</u></b> |       |
|--|---------------------|-------|
| Computer programming suggestions for tension loaded joints | 22.38               |       |
| logic flowcharts   | 22.29               | 22.30 |
| Computer simulation in statistical tolerancing             | 27.17               |       |
| Computing mechanisms                                       | 2.27                |       |
| Connecting mechanisms                                      | 2.17                |       |
| Contact stresses   | 36.19               |       |
| in cams  | 4.25                |       |
| in wear  | 34.8                |       |
| minimum permissible curvature                              | 4.26                |       |
| Contact zone half-width:                                   |                     |       |
| of cylinders   | 36.22               | 36.24 |
| of spheres (radius)  | 36.21               |       |
| Corliss valve gear   | 2.12                |       |
| Corrosion:   |                     |       |
| corrosion data for material selection                      | 35.28               |       |
| (table)  | 35.8                |       |
| corrosion rates  | 35.2                |       |
| introduction   | 35.1                |       |
| metal attack systems                                       | 35.2                |       |
| Corrosion rates  | 35.2                |       |
| Cost, relative, of common spring wires (table)             | 6.12                |       |
| Coulomb force  | 32.4                |       |
| Coupling mechanisms  | 2.17                |       |
| Coupling types:  |                     |       |
| beam   | 16.12               |       |
| bellows  | 16.17               |       |
| Cardan   | 16.25               |       |
| Centaloc   | 16.33               |       |
| chain  | 16.11               |       |

**Index terms****Links**Coupling types: *(Continued)*

|                    |       |       |
|--------------------|-------|-------|
| diaphragm          | 16.12 |       |
| double-Cardan      | 16.30 |       |
| flexible disk      | 16.9  |       |
| flexible elastomer | 16.19 |       |
| flexible shaft     | 16.16 |       |
| gear               | 16.13 |       |
| grid               | 16.11 |       |
| Hooke              | 16.25 |       |
| hydraulic          | 16.13 |       |
| link               | 16.10 |       |
| needle bearing     | 16.28 |       |
| pin-and-block      | 16.8  |       |
| precompressed      | 16.24 |       |
| rigid              | 16.7  |       |
| roller-trunion     | 16.31 |       |
| rotating link      | 16.25 | 16.32 |
| Rzeppa             | 16.31 |       |
| shear              | 16.22 |       |
| spring             | 16.15 |       |
| tension            | 16.23 |       |
| tire               | 16.23 |       |
| torus              | 16.23 |       |
| Tracta             | 16.30 |       |
| Uniflex            | 16.17 |       |
| Universal          | 16.25 |       |
| Couplings:         |       |       |
| attachment of      | 16.32 |       |
| flexible estomeric | 16.19 |       |
| flexible metallic  | 16.9  |       |
| general            | 16.2  |       |

**Index terms****Links**

|  |       |       |
|--|-------|-------|
| Couplings: <i>(Continued)</i>                      |       |       |
| rigid  | 16.7  |       |
| rotating link                                      | 16.25 |       |
| universal joint                                    | 16.25 |       |
| Covalent bonds                                     | 32.5  |       |
| Crafts and Lamont, addition method                 | 33.9  |       |
| role in general strength estimation                | 29.4  | 29.24 |
| Creep limit  | 32.45 |       |
| Creep rate   | 32.45 |       |
| Creep strength                                     | 32.45 |       |
| Critical diameter, ideal                           | 33.12 |       |
| Critical hardness                                  | 33.10 |       |
| Critical speeds in shafts                          | 17.17 |       |
| Rayleigh equation                                  | 17.17 | 17.17 |
| (table)  | 17.20 |       |
| Critical stress-intensity factor                   | 28.18 |       |
| Cup packings                                       | 21.13 |       |
| Curve, Jominy                                      | 33.20 |       |
| Curved beam equations (table)                      | 38.4  |       |
| Cycles-to-failure estimates, complicated variation | 29.20 |       |
| Cylinders:   |       |       |
| contacting, approach                               | 29.33 |       |
| in pressure vessels                                | 39.14 |       |
| stress   | 29.32 |       |
| Cylinder pair                                      | 2.3   |       |
| <b>D</b>   |       |       |
| Damping  | 31.2  |       |
| Damping ratio                                      | 31.5  |       |

**Index terms****Links**

|   |       |       |
|---|-------|-------|
| Datsko:   |       |       |
| method, use of                                  | 29.4  |       |
| notation  | 33.3  |       |
| rules   | 33.4  |       |
| Decrement, tempering                            | 33.10 |       |
| Defect, crystal                                 | 32.13 |       |
| Definitions and notation for stress             | 36.3  |       |
| Deflection:                                     |       |       |
| analysis of frames                              | 37.3  | 37.14 |
| angular twist                                   | 36.8  |       |
| bending   | 37.3  |       |
| due to bending                                  | 37.3  |       |
| stiffness or spring rate                        | 37.2  |       |
| Deflection of power screws                      | 13.8  |       |
| Degrees of freedom                              | 3.2   |       |
| Design:   |       |       |
| in pressure cylinders                           | 39.18 |       |
| Design considerations in worm gearing:          |       |       |
| bored worm blanks                               | 12.18 |       |
| gear-blank dimensions                           | 12.17 |       |
| gear pitch diameter                             | 12.14 |       |
| gear ratio                                      | 12.13 |       |
| number of teeth and threads                     | 12.13 |       |
| pitch   | 12.14 |       |
| thread and tooth proportions                    | 12.15 |       |
| tooth depth                                     | 12.16 |       |
| worm face                                       | 12.18 |       |
| Design of mounting in bevel and hypoid gearing: |       |       |
| axial thrust and radial separating force        | 11.53 |       |
| bearing loads                                   | 11.54 |       |
| hand of spiral                                  | 11.50 |       |

**Index terms****Links**

|  |       |       |
|--|-------|-------|
| Design of mounting in bevel and hypoid gearing: <i>(Continued)</i> |       |       |
| loaded contact check   | 11.55 |       |
| lubrication  | 11.54 |       |
| tangential force   | 11.51 |       |
| types of mountings   | 11.54 |       |
| Designer's fatigue diagram   | 17.15 | 29.19 |
| Deviation:   |       |       |
| fundamental  | 27.2  |       |
| lower  | 27.2  |       |
| upper  | 27.2  |       |
| Deviations in fits   | 27.4  |       |
| fundamental  | 27.4  |       |
| tolerance position letters   | 27.4  |       |
| in holes   | 27.5  |       |
| in shafts  | 27.5  |       |
| Diagram, designer's fatigue, for shafts                            | 17.15 |       |
| Diameter:  |       |       |
| carbon ideal   | 33.12 |       |
| critical ideal   | 33.12 |       |
| Diameter-pitch combination for metric (M) screw threads            |       |       |
| (table)  | 23.3  |       |
| Diamond-pyramid hardness   | 32.26 |       |
| Dipoles  | 32.6  |       |
| Distant hardness   | 33.16 |       |
| Distortion energy – ASME – elliptic fatigue locus:                 |       |       |
| for shafts   | 17.15 | 29.19 |
| Distortion energy-Gerber equation for shafts                       | 17.17 | 29.19 |
| Distortion energy theory   | 28.5  |       |
| Distribution, uniform, in tolerances                               | 27.17 |       |

**Index terms****Links**

## Double-enveloping worm gear sets:

|                                |       |
|--------------------------------|-------|
| base circle                    | 12.20 |
| gear blank dimensions          | 12.21 |
| gear ratio                     | 12.19 |
| materials                      | 12.22 |
| number of teeth and threads    | 12.18 |
| pitch                          | 12.19 |
| tooth and thread forms         | 12.20 |
| tooth depth proportions        | 12.20 |
| worm length                    | 12.21 |
| worm pitch and root diameter   | 12.19 |
| <i>(See also Worm gearing)</i> |       |

|                       |       |
|-----------------------|-------|
| Ductility, measure of | 32.37 |
|-----------------------|-------|

## Dynamic:

|                |       |
|----------------|-------|
| hardness       | 32.27 |
| factor in cams | 4.4   |
| viscosity      | 20.6  |

**E**

|                                     |       |
|-------------------------------------|-------|
| Eccentricity-loaded shear joint     | 22.14 |
| Eccentricity, in a journal bearing  | 19.4  |
| Eccentricity ratio                  | 19.15 |
| Efficiency of power screws          | 13.7  |
| (graph)                             | 13.7  |
| Elastic constant equation           | 36.7  |
| Elastic limit                       | 32.36 |
| Elasticity, modulus of              | 32.35 |
| Elastically restrained column ends: |       |
| critical buckling load              | 30.6  |
| differential equation               | 30.6  |

**Index terms****Links**

|  |       |       |
|--|-------|-------|
| Elastically restrained column ends: <i>(Continued)</i> |       |       |
| equation for $kL$                                      |       | 30.7  |
| Electrons  |       | 32.4  |
| Elongation, percent                                    |       | 32.37 |
| End plates in pressure vessels                         |       | 39.11 |
| Endloops of extension springs (table)                  |       | 6.33  |
| Energy variation, coefficient of:                      |       |       |
| in flywheels   |       | 7.7   |
| (example)  |       | 7.7   |
| Engineering (nominal) strain                           |       | 36.7  |
| Engineering steel chains:                              |       |       |
| dimensions   |       | 15.19 |
| nomenclature   |       | 15.18 |
| nonstandard  |       | 15.3  |
| sprockets for  |       | 15.3  |
| selection  | 15.19 | 15.20 |
| Engineering stress-strain                              |       | 32.30 |
| Epicyclic gears  |       | 2.16  |
| Equation, strain-strengthening                         |       | 32.33 |
| Equivalent load rating for power screws                |       | 13.10 |
| Escapement mechanisms                                  |       | 2.10  |
| Estimate:  |       |       |
| of yield strength after plastic strains                |       | 33.8  |
| of ultimate strength after heat treatment              |       | 33.9  |
| of ultimate strength after plastic strains             |       | 33.8  |
| Euler column buckling equation                         |       | 30.2  |
| pinned-end buckling load                               |       | 30.4  |
| Exponent, strain-strengthening                         |       | 32.38 |
| Extended position in power screws                      |       | 13.3  |

**Index terms****Links**

|  |       |       |
|--|-------|-------|
| Eyelets                                  | 24.10 |       |
| Eytelwein equation                       | 14.16 |       |
| <b>F</b>                                 |       |       |
| Fabrication of pressure vessels          | 39.17 |       |
| Face-centered cubic structure            | 32.12 |       |
| Face seals                               | 21.6  |       |
| Factor:                                  |       |       |
| application, in rolling-contact bearings | 18.15 |       |
| Buckingham load-stress                   | 29.33 |       |
| critical stress-intensity                | 28.18 |       |
| dynamic, in cams                         | 4.14  |       |
| fatigue strength modifications           | 29.9  |       |
| loading                                  | 29.12 |       |
| Marin fatigue modification               | 29.9  |       |
| miscellaneous                            | 29.16 | 29.18 |
| multiplying, for materials               | 33.21 |       |
| shape, in flywheels (table)              | 7.21  |       |
| size                                     | 29.11 |       |
| stress-concentration                     | 28.9  |       |
| stress intensity                         | 28.17 |       |
| surface finish                           | 29.11 |       |
| temperature                              | 29.13 |       |
| tempering                                | 33.10 |       |
| Fasteners:                               |       |       |
| threaded                                 | 23.1  |       |
| unthreaded                               | 24.1  |       |
| Fatigue:                                 |       |       |
| strength component, amplitude:           |       |       |
| for ASME-elliptic failure locus          | 29.19 |       |
| for Gerber failure locus                 | 29.19 |       |

**Index terms****Links**

|   |       |       |
|---|-------|-------|
| Fatigue: ( <i>Continued</i> )                 |       |       |
| for Smith-Dolan failure locus                 | 29.19 |       |
| strength component, steady                    | 29.18 |       |
| stress component, amplitude                   | 29.18 |       |
| stress component, steady                      | 29.18 |       |
| Fatigue diagram, designer's, for shafts       | 17.15 |       |
| Fatigue loading of bolted and riveted joints  | 22.31 |       |
| Fatigue locus for shafts:                     |       |       |
| distortion energy-ASME-elliptic               | 17.15 | 29.19 |
| distortion energy-Gerber                      | 17.15 | 29.19 |
| Smith-Dolan                                   | 29.19 |       |
| Fatigue strength modification factors (Marin) | 29.9  |       |
| Fatigue testing:                              |       |       |
| coaxing method                                | 29.5  |       |
| constant stress level testing                 | 29.5  |       |
| probit method                                 | 29.5  |       |
| Prot method                                   | 29.5  |       |
| sparse survey method                          | 29.4  |       |
| up-down method                                | 29.6  |       |
| Film bearing ( <i>see</i> Journal bearings)   |       |       |
| Fine adjustment mechanisms                    | 2.6   |       |
| Finished hex bolt, basic dimensions (table)   | 23.14 |       |
| Finite element method                         | 30.13 |       |
| Fit:  |       |       |
| standard fits (table)                         | 27.10 |       |
| U.S. standard                                 | 27.9  |       |
| Fits:   |       |       |
| hole basis                                    | 27.2  |       |
| preferred                                     | 27.7  |       |
| shaft basis                                   | 27.2  |       |

**Index terms****Links**

|                                    |       |
|------------------------------------|-------|
| Flat-belt drive                    | 14.16 |
| Flexible connector drives          | 14.4  |
| classification                     | 14.5  |
| forces                             | 14.7  |
| geometry                           | 14.5  |
| tensioning devices,                | 14.11 |
| ( <i>See also</i> Belt drives)     |       |
| Flexural formula                   | 36.15 |
| Flexure                            | 36.12 |
| Fluctuation, angular, in flywheels | 7.7   |
| (example)                          | 7.8   |
| Fluxes:                            |       |
| bonded                             | 26.12 |
| fused                              | 26.12 |
| Flywheels                          | 7.3   |
| Flywheels for energy storage:      |       |
| isotropic and anisotropic designs  | 7.20  |
| special considerations             | 7.21  |
| Force, Coulomb                     | 32.4  |
| Force and torque analysis of cams  | 4.22  |
| cam force                          | 4.24  |
| cam torque                         | 4.25  |
| critical angle                     | 4.23  |
| jump speed                         | 4.25  |
| springs                            | 4.25  |
| Four-bar linkage                   | 2.12  |
| Four-bar planer linkage:           |       |
| basic parameters                   | 3.4   |
| kinematic inversion                | 3.6   |
| torque ratio                       | 3.6   |

**Index terms****Links**Four-bar planer linkage: *(Continued)*

|                     |     |
|---------------------|-----|
| transmission angle, | 3.7 |
| velocity ratio      | 3.6 |

Four-bar planer linkage, dimensional synthesis:

|                     |      |
|---------------------|------|
| analysis synthesis  | 3.19 |
| geometric synthesis | 3.18 |

Four-bar planer linkage, kinematics:

|                           |      |
|---------------------------|------|
| dynamic behavior          | 3.10 |
| position geometry         | 3.8  |
| velocity and acceleration | 3.9  |

Four-bar planer linkage, motion generation:

|                             |      |
|-----------------------------|------|
| available computer programs | 3.17 |
| five positions in a plane   | 3.17 |
| four positions in a plane   | 3.12 |
| three positions in a plane  | 3.10 |
| two positions in a plane    | 3.10 |

Fracture mechanics 28.13

Fracture strain 32.37

Fracture strength 32.36

Fracture toughness 28.18

for some engineering materials 28.21

Function-generator mechanisms 2.26

**G**

Gaskets:

|                                |       |      |
|--------------------------------|-------|------|
| classification                 | 25.1  | 25.4 |
| compression and stress testing | 25.22 |      |
| design and selection           | 25.13 |      |
| environmental conditions       | 25.12 |      |
| installation specifications    | 25.23 |      |
| load-bearing properties        | 25.7  |      |

**Index terms****Links**

|                                  |       |      |
|----------------------------------|-------|------|
| Gaskets: ( <i>Continued</i> )    |       |      |
| permeability properties          | 25.3  |      |
| test method                      | 25.2  |      |
| Gasket base materials:           |       |      |
| binders and fillers              | 25.3  |      |
| metallic                         | 25.7  |      |
| nonmetallic                      | 25.3  |      |
| reinforcements                   | 25.6  |      |
| Gasket design and selection:     |       |      |
| ASME code procedure              | 25.13 |      |
| Whalen simplified procedure      | 25.14 |      |
| Gasket environmental conditions  | 25.12 |      |
| Gasket installation checklist    | 25.23 |      |
| Gasket properties:               |       |      |
| conformability and pressure      | 25.7  | 25.9 |
| creep and relaxation             | 25.10 |      |
| effect of geometry               | 25.11 |      |
| Gasket testing:                  |       |      |
| lead pellet test                 | 25.22 |      |
| NCR paper test                   | 25.23 |      |
| Gas-lubricating journal bearings | 19.43 |      |
| axially grooved                  | 19.50 |      |
| limiting solutions               | 19.44 |      |
| noncircular                      | 19.51 |      |
| ungrooved                        | 19.45 |      |
| Gearing:                         |       |      |
| bevel                            | 11.1  |      |
| helical                          | 10.1  |      |
| hypoid                           | 11.1  |      |
| spur                             | 9.3   |      |
| worm                             | 12.1  |      |

| <b><u>Index terms</u></b>                          | <b><u>Links</u></b> |      |
|--|---------------------|------|
| Gear strength in bevel and hypoid gearing          | 11.25               |      |
| allowable stresses                                 | 11.33               |      |
| formulas for contact and bending strength          | 11.31               |      |
| scoring resistance                                 | 11.42               |      |
| Gear-tooth dimensions in bevel and hypoid gearing: |                     |      |
| AGMA references                                    | 11.25               |      |
| bevel-gear tooth dimensions                        | 11.19               |      |
| hypoid dimensions                                  | 11.24               |      |
| tooth taper  | 11.19               |      |
| Gear trains:                                       |                     |      |
| differential gear trains                           | 5.14                |      |
| gear type selection                                | 5.3                 |      |
| ordinary gear trains                               | 5.1                 |      |
| planetary gear trains                              | 5.14                |      |
| Geneva stops                                       | 2.11                | 2.21 |
| Geometric:   |                     |      |
| acceleration                                       | 4.4                 |      |
| jerk   | 4.6                 |      |
| velocity   | 4.4                 |      |
| Gerber parabolic fatigue locus                     | 17.15               |      |
| Golden section search                              | 30.12               |      |
| Grade markings:                                    |                     |      |
| ASME (table)                                       | 23.9                |      |
| metric   | 23.10               |      |
| SAE (table)  | 23.8                |      |
| Grommets   | 24.16               |      |
| Grossmann and Fields multiplication method         | 33.12               |      |
| role in estimating local strength                  | 29.4                |      |
| block diagram                                      | 29.24               |      |
| (example)  | 29.26               |      |

**Index terms****Links**

|                             |       |       |
|-----------------------------|-------|-------|
| Grubler criterion           | 3.4   |       |
| Gumbel conditions           | 19.16 |       |
| <b>H</b>                    |       |       |
| Hardness                    | 32.3  | 32.23 |
| as quenched                 | 33.10 |       |
| Brinell                     | 32.24 |       |
| critical                    | 33.10 |       |
| diamond pyramid             | 32.26 |       |
| distant                     | 33.16 |       |
| dynamic                     | 32.27 |       |
| initial                     | 33.16 |       |
| Knoop                       | 32.27 |       |
| Meyer                       | 32.25 |       |
| Rockwell                    | 32.23 |       |
| scleroscope                 | 32.27 |       |
| Heavy structural hex bolt   | 23.5  |       |
| dimensions (table)          | 23.7  |       |
| Helical gear geometry       | 10.5  |       |
| Helical gear load rating    | 10.9  |       |
| Helical gear types:         |       |       |
| continuous (herringbone)    | 10.2  |       |
| double conventional         | 10.2  |       |
| double staggered            | 10.2  |       |
| single                      | 10.2  |       |
| Helical gearing advantages: |       |       |
| load capacity               | 10.4  |       |
| manufacturing               | 10.4  |       |
| noise                       | 10.2  |       |
| Helical gears:              |       |       |
| advantages                  | 10.2  |       |

**Index terms****Links**

|   |       |
|---|-------|
| Helical gears: ( <i>Continued</i> )                         |       |
| geometry  | 10.5  |
| load rating   | 10.8  |
| Hesitation mechanisms                                       | 2.21  |
| High-cycle fatigue strength approximation                   | 29.19 |
| High-cycle fatigue strength cycles-to-failure:              |       |
| estimate (example)  | 29.21 |
| High-cycle fatigue strength equation                        | 29.25 |
| Hoisting mechanisms   | 2.6   |
| Hole-basis for fits   | 27.2  |
| Hollow shaft correction                                     | 17.19 |
| Hooke's law   | 36.7  |
| Hybrid journal bearings ( <i>see</i> Journal bearings)      |       |
| Hydrodynamic bearing ( <i>see</i> Journal bearings)         |       |
| Hydrostatic journal bearings ( <i>see</i> Journal bearings) |       |
| Hydrostatic journal bearing design                          | 19.52 |
| classification  | 19.52 |
| design parameters   | 19.54 |
| design procedures   | 19.54 |
| Hypoid gears ( <i>see</i> Bevel and hypoid gears)           |       |

**I**

|                                     |       |
|-------------------------------------|-------|
| Ideal critical diameter             | 33.12 |
| IMP (Integrated Mechanisms Program) | 3.23  |
| Impact strength                     | 32.44 |
| Increments, alloy                   | 33.10 |
| ( <i>See also</i> Alloy increments) |       |
| Index, viscosity                    | 20.7  |
| improvers                           | 20.8  |

**Index terms****Links**

|  |       |      |
|--|-------|------|
| Indexing mechanisms  | 2.11  |      |
| Initial hardness   | 33.16 |      |
| Integration:   |       |      |
| torque-angle in flywheel                                   | 7.5   |      |
| Instability in beams                                       | 30.14 |      |
| (example)  | 30.16 |      |
| Interference-fit stresses                                  | 27.9  |      |
| (example)  | 27.11 |      |
| International tolerance grade                              | 27.2  |      |
| Interpolation formula for L/D                              | 19.28 |      |
| IT (International tolerance grade)                         | 27.2  |      |
| <b>J</b>   |       |      |
| J.B. Johnson buckling equation in power screws             | 13.8  |      |
| Jerk, geometric  | 4.6   |      |
| Joints:  |       |      |
| bolted   | 22.3  |      |
| friction type  | 22.12 |      |
| in pressure vessels  | 39.12 |      |
| riveted  | 22.3  |      |
| shear  | 22.6  |      |
| welded   | 26.23 |      |
| Joints, tension loaded ( <i>see</i> Tension-loaded joints) |       |      |
| Jominy:  |       |      |
| curve  | 33.20 |      |
| distance   | 33.9  |      |
| specimen   | 33.9  |      |
| test   | 28.2  | 33.9 |
| Journal bearings:  |       |      |
| bearing and journal configurations                         | 19.4  |      |

**Index terms****Links**Journal bearings: *(Continued)*

|               |      |
|---------------|------|
| clearance     | 19.5 |
| elliptical    | 19.5 |
| fitted        | 19.6 |
| foil          | 19.7 |
| full bearings | 19.4 |
| lobed         | 19.6 |
| offset        | 19.6 |
| partial       | 19.4 |
| pivoted shoe  | 19.6 |
| rocking       | 19.6 |
| shapes        | 19.7 |
| step          | 19.6 |
| tilting pad   | 19.6 |

## Journal bearing material and selection criteria:

|                    |       |
|--------------------|-------|
| material selection | 19.2  |
| materials          | 19.7  |
| pressure equation  | 19.13 |

## Journal bearing performance:

|                    |       |
|--------------------|-------|
| friction relations | 19.18 |
| load relation      | 19.16 |
| lubricant flow     | 19.18 |
| thermal relations  | 19.19 |

**K**

|                            |       |
|----------------------------|-------|
| Keys                       | 24.23 |
| Kinematic viscosity        | 20.6  |
| Kinematics of power screws | 13.3  |
| Knoop hardness             | 32.27 |

**Index terms****Links**

| <b>L</b>                                       |       |
|--|-------|
| Ladle analysis                                 | 33.9  |
| Lame formula                                   | 39.9  |
| Langer first-cycle-yield line                  | 17.16 |
| Latch mechanisms                               | 2.14  |
| Lattice points                                 | 32.10 |
| Lattice, space                                 | 32.10 |
| Levai representation of a planetary gear train | 5.9   |
| Life, in rolling-contact bearings:             |       |
| mean   | 18.9  |
| median   | 18.9  |
| Life, wear                                     | 34.1  |
| Limit, creep                                   | 32.45 |
| Limit, elastic                                 | 32.36 |
| Limiting stress criterion in columns           | 30.8  |
| deflection curve                               | 30.9  |
| differential equation for crooked column       | 30.9  |
| maximum bending moment                         | 30.9  |
| stress equation                                | 30.10 |
| LINCAGES (program)                             | 3.23  |
| Linear actuators                               | 2.5   |
| Linear wear equation                           | 34.13 |
| Line-call-out in gaskets                       | 25.2  |
| Linkage concepts:                              |       |
| degrees-of-freedom                             | 3.1   |
| kinematic elements                             | 3.1   |
| number synthesis                               | 3.3   |
| Linkages:                                      |       |
| crank-angle coordination                       | 3.18  |
| four-bar planer linkage                        | 3.4   |

**Index terms****Links**Linkages: *(Continued)*

|   |       |       |
|---|-------|-------|
| kinematic analysis of four bar linkage                      | 3.8   |       |
| linkage concepts  | 3.1   |       |
| mobility criterion  | 3.4   |       |
| pole-force method   | 3.20  |       |
| precision positions   | 3.4   |       |
| spatial linkages  | 3.21  |       |
| Lip seals, radial   | 21.4  |       |
| Liquid-lubricated journal bearing:                          |       |       |
| design charts   | 19.23 |       |
| L/D effects   | 19.20 |       |
| optimization  | 19.40 |       |
| Load(s):  |       |       |
| in pressure vessels   | 39.4  |       |
| Load-induced von Mises stresses in shafts:                  |       |       |
| components due to press-fit                                 | 17.15 |       |
| steady stress component                                     | 17.14 |       |
| stress amplitude component                                  | 17.14 |       |
| Load line in a shaft  | 17.16 | 29.31 |
| critical slope  | 17.16 |       |
| slope   | 17.16 |       |
| Load-life-reliability equation for rolling-contact bearings | 18.12 |       |
| Loading:  |       |       |
| combined  | 29.27 |       |
| simple  | 29.27 |       |
| Loading in rolling-contact bearings                         | 18.15 |       |
| continuously varying  | 18.15 |       |
| step wise varying   | 18.15 |       |
| Loading mechanisms  | 2.23  |       |
| Loads on shear joints                                       | 22.13 |       |

| <b><u>Index terms</u></b>                     | <b><u>Links</u></b> |      |
|---|---------------------|------|
| Locating mechanisms                           | 2.9                 |      |
| Logarithmic strain                            | 32.31               |      |
| Logic flowchart for estimating local strength | 29.24               |      |
| Lognormal variates:                           |                     |      |
| distribution in high-cycle fatigue            | 29.4                |      |
| Marin factors                                 | 29.9                |      |
| Lubricants:                                   |                     |      |
| deterioration                                 | 20.12               |      |
| feed  | 20.16               |      |
| function                                      | 20.1                |      |
| gas   | 20.26               |      |
| grease  | 20.17               |      |
| liquid  | 20.3                |      |
| selection of                                  | 20.14               |      |
| selection of type of                          | 20.2                |      |
| solid   | 20.22               |      |
| storage                                       | 20.29               |      |
| unconventional                                | 20.1                |      |
| Lubrication:                                  |                     |      |
| boundary                                      | 20.4                | 20.9 |
| elastohydrodynamic                            | 20.5                |      |
| hydrodynamic                                  | 20.4                |      |
| mixed   | 20.4                |      |
| thick film                                    | 20.4                |      |
| Lubrication of, and wear in chain             | 15.14               |      |
| application of lubricants                     | 15.14               |      |
| chain-casing reservoirs                       | 15.16               |      |
| flow rates                                    | 15.15               |      |
| purposes                                      | 15.14               |      |
| recommendation                                | 15.17               |      |
| types of lubrication                          | 15.16               |      |

**Index terms****Links****M**

Manufacturing of bevel and hypoid gears:

|                         |      |
|-------------------------|------|
| localization of contact | 11.7 |
| methods of generation   | 11.7 |
| testing                 | 11.7 |

Marin fatigue modification factors:

|                              |       |
|------------------------------|-------|
| loading factor               | 29.12 |
| miscellaneous effects factor | 29.16 |
| size factor                  | 29.1  |
| surface factor               | 29.11 |
| temperature factor           | 29.13 |

Material, brittle **28.7**

Materials:

|                      |       |
|----------------------|-------|
| for pressure vessels | 39.17 |
|----------------------|-------|

Maximum pressure in zone of contact:

|              |       |
|--------------|-------|
| of cylinders | 36.22 |
| of spheres   | 36.20 |

Mean life in rolling-contact bearings **18.9**

Mechanism types:

|                    |      |
|--------------------|------|
| clamping           | 2.8  |
| computing          | 2.27 |
| connecting         | 2.17 |
| coupling           | 2.17 |
| escapement         | 2.10 |
| fine adjustment    | 2.6  |
| function generator | 2.26 |
| hesitation         | 2.21 |
| indexing           | 2.11 |
| latching           | 2.14 |
| linear actuators   | 2.5  |
| loading            | 2.23 |

**Index terms****Links**Mechanism types: *(Continued)*

|   |       |
|---|-------|
| locating                                | 2.9   |
| oscillating                             | 2.12  |
| path generators                         | 39.23 |
| pause                                   | 2.21  |
| ratchet                                 | 2.14  |
| reciprocating                           | 2.15  |
| reversing                               | 2.16  |
| robot                                   | 2.29  |
| slider-connector                        | 2.20  |
| snap-action                             | 2.4   |
| speed-changing                          | 2.28  |
| stop                                    | 2.21  |
| transportation                          | 2.22  |
| unloading                               | 2.23  |
| Mechanisms, a thesaurus of              | 2.3   |
| Mechanisms of wear                      | 34.2  |
| Median life in rolling-contact bearings | 18.9  |
| Membrane theory                         | 39.6  |
| Meridional plane                        | 39.1  |
| Metal attack systems                    | 35.2  |
| crevice corrosion and pitting           | 35.5  |
| galvanic corrosion and protection       | 35.3  |
| general attack                          | 35.2  |
| hydrogen embrittlement                  | 35.7  |
| intergranular corrosion                 | 35.7  |
| mechanical contributions                | 35.28 |
| passivation                             | 35.4  |
| sacrificial anodes                      | 35.6  |
| selective leaching                      | 35.6  |
| stress-corrosion cracking               | 35.6  |

| <b><u>Index terms</u></b>                | <b><u>Links</u></b> |
|--|---------------------|
| Metallic bond                            | 32.5                |
| Metallic sealing rings                   | 21.6                |
| Method for bending deflection of shafts: |                     |
| basis for tabular method                 | 17.5                |
| (table)                                  | 17.5    17.7        |
| Method for combined deflection of shafts | 17.11               |
| (table)                                  | 17.12               |
| Method for shear deflection of shafts    | 17.8                |
| (table)                                  | 17.8    17.10       |
| Metric hex bolts:                        |                     |
| head dimensions (table)                  | 23.7                |
| thread length                            | 23.6                |
| Metric standards of limits and fits      | 27.2                |
| Meyer hardness                           | 32.25               |
| Minimum fillet weld size                 | 26.42               |
| Misalignment penalty                     | 18.18               |
| Mobility criterion                       | 3.4                 |
| Grubler criterion                        | 3.4                 |
| Modes of wear failure                    | 34.11               |
| Modified buckling equations              | 30.7                |
| Modified Mohr theory of failure          | 28.8                |
| Modulus of elasticity (Young)            | 32.35               |
| Modulus:                                 |                     |
| of elasticity                            | 36.7                |
| of rigidity                              | 36.7                |
| shear modulus of rigidity                | 36.7                |
| tangent                                  | 30.8                |
| Young's                                  | 32.35               |
| Mohr's circle                            | 36.4                |
| programming                              | 36.5                |

| <b><u>Index terms</u></b>                             |       | <b><u>Links</u></b> |
|---|-------|---------------------|
| Molecular solids                                      | 32.7  |                     |
| Mucking machines                                      | 2.24  |                     |
| Multiplicative method of Grossman and Fields          | 33.12 |                     |
| <b>N</b>  |       |                     |
| Natural strain  | 32.31 |                     |
| Nature of the welding arc                             | 26.4  |                     |
| Navier-Stokes equation                                | 19.13 |                     |
| NCR (National Cash Register Company)                  |       |                     |
| paper test  | 25.23 |                     |
| NEMA (National Electrical Manufacturers Association): |       |                     |
| color identification                                  | 26.20 |                     |
| Neutral axis (surface)                                | 36.15 |                     |
| Neutrons  | 32.4  |                     |
| Nil-ductility temperature                             | 32.45 |                     |
| Nominal (engineering) strain                          | 32.29 |                     |
| Noncontacting seals                                   | 21.9  |                     |
| Nonferrous metals                                     | 28.17 |                     |
| Nordberg radial engines                               | 2.15  |                     |
| Normal distribution in statistical tolerancing        | 27.18 |                     |
| Notation of Datsko                                    | 33.3  |                     |
| Notch sensitivity                                     | 28.10 |                     |
| factor  | 28.10 |                     |
| mean notch sensitivities                              | 29.18 |                     |
| scatterbands  | 29.17 |                     |
| Nucleus   | 32.4  |                     |
| Number, Summerfield                                   | 19.7  | 20.3                |
| Number:   |       |                     |
| atomic  | 32.4  |                     |
| quantum   | 32.4  |                     |

**Index terms****Links**

Numbering, system for metals:

|                      |       |
|----------------------|-------|
| AISI                 | 32.53 |
| for aluminum alloys  | 32.54 |
| for copper alloys    | 32.55 |
| for magnesium alloys | 32.56 |
| SAE                  | 32.53 |

Nuts **23.28**

**O**

Octahedral shear stress **28.5**

  limiting value **28.6**

Octahedral shear theory **28.5**

Offset **32.36**

Offset slider-crank planer linkage **3.8**

Oldham coupling **2.18**

Optimization of journal bearings **19.40**

Ordered principal stresses **28.6**

O-ring materials **21.3**

O-ring seals **21.1**

  circular sections

    standard sizes (table) **21.2**

    standard sizes, rectangular sections (table) **21.3**

Oscillating mechanisms **2.12**

Overhauling screws **13.3**

Overrunning clutches **8.5**

**P**

Packing, compression **21.6**

Parabolic buckling formula (Johnson) **13.8**

Parameters in wear equation **34.6**

| <b><u>Index terms</u></b>                      | <b><u>Links</u></b> |
|--|---------------------|
| Path generator mechanisms                      | 2.25                |
| Pause mechanisms                               | 2.21                |
| Pawl   | 2.14                |
| Peaucellier linkage                            | 2.25                |
| Percent elongation                             | 32.37               |
| Permissible speeds in rolling-contact bearings | 18.8                |
| Permissible stresses and strains               | 28.4                |
| role of design factor                          | 28.4                |
| role of factor of safety                       | 28.4                |
| Pinion   | 9.3                 |
| Pins   | 24.8                |
| types of                                       | 24.8                |
| Pin joint                                      | 2.3                 |
| Pipe threads                                   | 23.5                |
| inside dimensional (table)                     | 23.5                |
| Piston rings                                   | 21.15               |
| Pitch:   |                     |
| angle  | 9.6                 |
| base   | 9.5                 |
| circle   | 9.3                 |
| circular                                       | 9.3                 |
| diameter                                       | 9.3                 |
| diametral                                      | 9.3                 |
| Planar pair                                    | 2.3                 |
| Plane stress                                   | 36.3                |
| Plastic true strain                            | 36.12               |
| conversion equation                            | 36.12               |
| Plates in pressure vessels                     | 39.12               |
| Points, lattice                                | 32.10               |
| Poisson ratio                                  | 36.7                |

| <b><u>Index terms</u></b>                          | <b><u>Links</u></b> |
|--|---------------------|
| Pole-force method in linkages                      | 3.20                |
| Poly dyne cams                                     | 4.14                |
| Polynomial cam motions                             | 4.14                |
| Power:   |                     |
| screws   | 13.2                |
| springs  | 6.63                |
| Precipitation hardening                            | 32.22               |
| Precision:   |                     |
| positions  | 3.4                 |
| Chebychev spacing                                  | 3.4                 |
| Preferred fits                                     | 27.7                |
| Pressure vessels                                   | 39.1                |
| Pressurized bearing ( <i>see</i> Journal bearings) |                     |
| Pretension in springs                              | 6.31                |
| Pretensioning of belts:                            |                     |
| by adjusting center distance                       | 14.13               |
| by belt strain                                     | 14.13               |
| by slackside tensioner                             | 14.13               |
| by torque  | 14.16               |
| (illustrations)                                    | 14.15               |
| Primary shear                                      | 22.15               |
| Principal directions                               | 36.4                |
| Principal stress cubic equation                    | 36.6                |
| Principal stresses                                 | 36.4                |
| ordered  | 28.6                |
| Prismatic pair                                     | 2.3                 |
| Product moment of inertia                          | A.14                |
| Programming a cam system                           | 4.26                |
| logic flowchart                                    | 4.27                |
| program steps                                      | 4.26                |

**Index terms****Links**

|   |       |
|---|-------|
| Programming suggestions for tension-loaded joints     | 22.38 |
| logic flowcharts                                      | 22.39 |
| Proof strength  | 32.36 |
| Properties, tensile                                   | 32.34 |
| (table)   | 32.49 |
| Properties of beams in bending (table)                | 37.4  |
| Properties of common spring materials (table)         | 6.9   |
| Properties of sections (table)                        | A.3   |
| Protons   | 32.4  |
| Pure tension, definition                              | 36.4  |
| <b>Q</b>  |       |
| Q factor  | 31.16 |
| Quantum number  | 32.4  |
| Quick-return mechanism                                | 2.12  |
| <b>R</b>  |       |
| Radial and thrust loading in rolling-contact bearings | 18.14 |
| Radial clearance in journal bearings                  | 19.3  |
| Radial lip seals                                      | 21.4  |
| Radius of gyration                                    | A.13  |
| Raimondi and Boyd charts                              | 19.23 |
| Rainflow counting technique                           | 29.21 |
| Range of motion in power screws                       | 13.3  |
| Ratchet mechanisms                                    | 2.14  |
| Rate:   |       |
| creep   | 32.45 |
| spring  | 37.2  |
| Rated life of ball screws                             | 13.10 |
| Rating life of rolling-contact bearings               | 18.9  |

| <b><u>Index terms</u></b>             | <b><u>Links</u></b> |       |
|---------------------------------------|---------------------|-------|
| RCCC linkage                          | 2.13                |       |
| RCCR coupling                         | 2.19                |       |
| RCCR linkage                          | 3.3                 |       |
| Reciprocating mechanisms              | 2.15                |       |
| Reciprocating motion seals            | 21.9                |       |
| lip packings                          | 21.13               |       |
| O-rings                               | 21.9                |       |
| piston rings                          | 21.15               |       |
| Reduction of area                     | 32.37               |       |
| Relations, natural and nominal strain | 32.38               |       |
| true and nominal stress               | 32.38               |       |
| Renard geometric series               | 27.2                |       |
| Retaining rings                       | 24.16               | 24.18 |
| stamped                               | 24.18               |       |
| Retracted position in power screws    | 13.3                |       |
| Reversing mechanisms                  | 2.16                |       |
| Revolvute pair                        | 2.3                 |       |
| Reynolds equation                     | 19.14               |       |
| RGGR coupling                         | 2.20                |       |
| RGGR linkage                          | 2.13                | 3.21  |
| Ring with distributed loading         | 38.13               |       |
| (example)                             | 38.14               |       |
| Rings, retaining                      | 24.16               | 24.18 |
| stamped                               | 24.18               |       |
| Ring-segment:                         |                     |       |
| deflection due to concentrated load   | 38.19               |       |
| with distributed load                 | 38.20               |       |
| with fixed ends                       | 38.15               |       |
| with one support                      | 38.3                | 38.9  |
| with simple supports                  | 38.11               |       |

**Index terms****Links**

|  |       |      |
|--|-------|------|
| Ring-segment: ( <i>Continued</i> )                     |       |      |
| with symmetrical loads                                 | 38.12 |      |
| Rivets:  |       |      |
| head shapes  | 24.1  |      |
| sizes and material                                     | 24.3  |      |
| types  | 24.2  |      |
| Robot mechanisms                                       | 2.29  |      |
| Rockwell hardness                                      | 32.23 |      |
| Rod scrapers   | 21.14 |      |
| Roller bearings ( <i>see</i> Rolling-contact bearings) |       |      |
| Roller chains:   |       |      |
| dimensioning   | 15.4  |      |
| double-pitch   | 15.2  |      |
| multistrand  | 15.2  |      |
| nomenclature   | 15.4  |      |
| nonstandard  | 15.3  |      |
| numbering  | 15.5  |      |
| selection  | 15.7  |      |
| sprockets  | 15.3  | 15.6 |
| standard   | 15.2  |      |
| strength   | 15.5  |      |
| Rolling-contact bearings:                              |       |      |
| application factor                                     | 18.15 |      |
| basic load rating                                      | 18.9  |      |
| coefficients of friction (table)                       | 18.8  |      |
| combined loading                                       | 18.14 |      |
| (illustrations)  | 18.4  |      |
| load-life relation at constant reliability             | 18.9  |      |
| load-life-reliability relation                         | 18.11 |      |
| variable loading                                       | 18.15 |      |

**Index terms****Links**

|                                |       |
|--------------------------------|-------|
| Rotary motion seals:           |       |
| cast iron sealing rings        | 21.6  |
| compression packing            | 21.6  |
| face seals                     | 21.6  |
| metal sealing rings            | 21.6  |
| noncontacting seals            | 21.9  |
| O-rings                        | 21.4  |
| radial lip seals               | 21.4  |
| Rouleaux coupling              | 2.19  |
| Round-head bolts:              |       |
| dimensions                     | 23.12 |
| (table)                        | 23.13 |
| RRGC linkage                   | 2.13  |
| RRGRR linkage                  | 2.13  |
| R.R. Moore test                | 29.4  |
| Rubber                         | 25.6  |
| Rules of Datsko                | 33.4  |
| Running torque of power screws | 13.7  |
| Rupture                        | 28.7  |
| Rzeppa universal joint         | 16.31 |

**S**

|                            |       |
|----------------------------|-------|
| S shapes                   | A.24  |
| Sceroscope hardness        | 32.27 |
| Scooping mechanisms        | 2.24  |
| Scotch yoke mechanism      | 2.15  |
| Scotch yoke sine generator | 2.27  |
| Screw clamp                | 2.8   |
| Screw pair                 | 2.3   |

| <b><u>Index terms</u></b>                        | <b><u>Links</u></b> |       |
|--|---------------------|-------|
| Screw threads:                                   |                     |       |
| metric series                                    | 23.1                |       |
| unified inch series                              | 23.1                |       |
| Screws:  |                     |       |
| cap screw  | 23.11               | 23.13 |
| flat counter-sunk, cap                           | 23.13               |       |
| formed   | 23.11               | 23.14 |
| heavy  | 23.11               | 23.14 |
| machine  | 23.22               |       |
| power  | 13.2                |       |
| shoulder   | 23.15               |       |
| slotted-head set screw                           | 23.19               | 23.22 |
| socket button-head cap                           | 23.13               |       |
| socket-head cap                                  | 23.13               |       |
| tapping  | 23.35               |       |
| Seal rings                                       | 21.1                |       |
| Sealing rings, metallic                          | 21.6                |       |
| Seals for rotary motion                          | 21.4                |       |
| Secondary bonds                                  | 32.6                |       |
| Second moment of area                            | A.11                | A.13  |
| radius of gyration                               | A.13                |       |
| transfer formula                                 | A.13                |       |
| Section modulus                                  | 36.16               |       |
| Sections and shapes, tabular data:               |                     |       |
| centroids and center of gravity                  | A.1                 |       |
| second moments of areas                          | A.11                |       |
| structural shapes                                | A.14                |       |
| Selecting materials for wear resistance          | 34.7                |       |
| Selection guidelines in rolling-contact bearings | 18.8                |       |
| Self-lowering screws                             | 13.3                |       |

| <b><u>Index terms</u></b>                    | <b><u>Links</u></b> |
|--|---------------------|
| Set screws                                   | 23.19               |
| Set, in springs                              | 6.21                |
| Several degree-of-freedom systems:           |                     |
| multi-degree-of-freedom systems:             |                     |
| continuous                                   | 31.26               |
| Rayleigh method                              | 31.26               |
| geared                                       | 31.25               |
| Holzer numerical method for                  | 31.23               |
| two degree-of-freedom systems                | 31.19               |
| forced vibration                             | 31.20               |
| free vibration                               | 31.19               |
| Shaft diameter in general shaft loading      | 29.32               |
| Shaft terminology                            | 17.2                |
| Shafts:                                      |                     |
| critical speeds                              | 17.17               |
| distortion due to:                           |                     |
| bending                                      | 17.3                |
| torsion                                      | 17.13               |
| transverse shear                             | 17.8                |
| hollow                                       | 17.19               |
| introduction                                 | 17.2                |
| load-induced stresses                        | 17.14               |
| materials                                    | 17.13               |
| strength                                     | 17.15               |
| Shape factor for isotropic flywheels (table) | 7.21                |
| Shear deflection of shafts, tabular method   | 17.8                |
| (table)                                      | 17.5   17.10        |
| Shear flow                                   | 36.16               |
| Shear strain                                 | 36.7                |
| Shear stress, definition                     | 36.6                |

| <b><u>Index terms</u></b>                          | <b><u>Links</u></b> |
|--|---------------------|
| Shift basis for fits                               | 27.2                |
| Shoulder screws                                    | 23.15               |
| Silent chain:                                      |                     |
| dimensions   | 15.25               |
| nomenclature                                       | 15.25               |
| nonstandard  | 15.4                |
| numbering  | 15.26               |
| selection  | 15.28               |
| sprockets for                                      | 15.4   15.27        |
| standard   | 15.4                |
| tooth form   | 15.27               |
| Simple eccentric cam motions                       | 4.15                |
| Simpson's rule integration in ring deformation     | 38.19               |
| Simulation in statistical tolerancing:             |                     |
| confidence interval on probability of interference | 27.18               |
| error in simulation                                | 27.18               |
| Single degree-of-freedom systems:                  |                     |
| critically damped                                  | 31.5                |
| force transmissibility                             | 31.10               |
| forced vibration                                   | 31.8                |
| foundation-excited                                 | 31.11               |
| free vibration                                     | 31.1                |
| overdamped   | 31.5                |
| resonance, bandwidth, and Q-factor                 | 31.16               |
| rotating balance                                   | 31.11               |
| Runga-Kutta numerical method in                    | 31.17               |
| torsional systems                                  | 31.7                |
| forced   | 31.17               |
| undamped   | 31.2                |
| underdamped  | 31.3                |
| ( <i>See also</i> Vibration)                       |                     |

| <b><u>Index terms</u></b>           | <b><u>Links</u></b> |
|-------------------------------------|---------------------|
| Six rules of Datsko                 | 33.4                |
| 6R robot mechanism                  | 2.29                |
| Size factors                        | 29.11               |
| Sizes:                              |                     |
| of fillet welds                     | 26.32               |
| of metal grains                     | 32.20               |
| Slenderness ratio                   | 30.11               |
| Slider-:                            |                     |
| connector mechanisms                | 2.20                |
| crank mechanisms                    | 2.15                |
| Sliding speed in wear               | 34.9                |
| Slotted-head cap screws             | 23.19    23.22      |
| SN diagram:                         |                     |
| random loading                      | 29.8                |
| sinusoidal loading                  | 29.8                |
| Snap-action mechanisms              | 2.4                 |
| Smith-Dolan fatigue locus           | 29.19               |
| Socket-head cap screws              | 23.13               |
| Sockets and keys                    | 23.11               |
| Solids, structure of                | 32.3                |
| amorphous                           | 32.6                |
| molecular                           | 32.7                |
| Sommerfeld:                         |                     |
| conditions                          | 19.16               |
| number                              | 19.17    20.3       |
| Speed-changing mechanisms           | 2.28                |
| Speed-dependent torque in flywheels | 7.9                 |
| (example)                           | 7.12                |
| Speed fluctuation, coefficient of   | 7.3                 |
| (table)                             | 7.4                 |

| <b><u>Index terms</u></b>   | <b><u>Links</u></b> |
|---|---------------------|
| Speeds, permissible, in rolling-contact bearings                      | 18.8                |
| Spheric pair  | 2.3                 |
| Springs:  |                     |
| Belleville spring washer  | 6.40                |
| constant-force  | 6.58                |
| flat  | 6.55                |
| glossary  | 6.4                 |
| helical compression   | 6.12                |
| helical extension   | 6.29                |
| helical torsion   | 6.36                |
| hot-wound   | 6.66                |
| materials   | 6.6                 |
| power   | 6.63                |
| special spring washers  | 6.51                |
| torsion bar   | 6.62                |
| Spring clips  | 2.4                 |
| Spur gear:  |                     |
| modules (table)   | 9.6                 |
| pitches (table)   | 9.6                 |
| tooth systems (table)   | 9.6                 |
| Spur gears:   |                     |
| definitions   | 9.3                 |
| force analysis  | 9.7                 |
| fundamental AGMA rating formulas                                      | 9.7                 |
| tooth dimensions and standards  | 9.6                 |
| Square threads in power screws  | 13.3                |
| Stacking of tolerances  | 27.14               |
| Standard diameter-pitch combinations for metric (M) screw<br>threads: |                     |
| (table)   | 23.3                |
| Standard fits   | 27.10               |

| <b><u>Index terms</u></b>                        | <b><u>Links</u></b> |       |       |
|--|---------------------|-------|-------|
| Standard series of screw threads, constant-pitch | 23.1                |       |       |
| Static failure theory                            | 28.3                |       |       |
| Statistical tolerances                           | 27.16               |       |       |
| Stiffness  | 37.2                |       |       |
| scale  | 37.2                |       |       |
| spring rate, tensile or torsional                | 37.2                |       |       |
| Stop mechanisms                                  | 2.21                |       |       |
| Strain(s):                                       |                     |       |       |
| engineering                                      | 32.29               | 36.8  |       |
| fracture   | 32.37               |       |       |
| logarithmic                                      | 32.31               |       |       |
| natural  | 32.31               |       |       |
| nominal  | 32.29               |       |       |
| plastic  | 36.12               |       |       |
| principal  | 36.8                |       |       |
| relations between                                | 32.38               | 36.12 |       |
| shear  | 36.7                |       |       |
| true   | 32.31               | 36.12 |       |
| Strain energy (table)                            | 38.8                |       |       |
| Strain-strengthening exponent                    | 32.33               |       |       |
| for materials of interest (tables)               | 32.49               | 32.50 | 32.52 |
| Strength   | 32.3                | 32.20 | 32.28 |
| breaking   | 32.36               |       |       |
| creep  | 32.45               |       |       |
| estimation                                       | 33.2                |       |       |
| fracture   | 32.33               |       |       |
| impact   | 32.44               |       |       |
| proof  | 32.36               |       |       |
| tensile  | 32.36               |       |       |
| ultimate   | 32.36               |       |       |
| yield  | 32.36               |       |       |

**Index terms****Links**

|  |       |
|--|-------|
| Strength and safety in flywheels:          |       |
| materials                                  | 7.21  |
| safety                                     | 7.24  |
| Strength at critical locations:            |       |
| cold-formed eyebolt example                | 29.22 |
| cold-formed flat spring example            | 29.23 |
| Strength coefficient                       | 32.33 |
| Strength in shafts                         | 17.15 |
| Stress                                     | 32.28 |
| Stress:                                    |       |
| contact                                    | 36.19 |
| definition and notation                    | 36.3  |
| due to temperature                         | 36.16 |
| flexure                                    | 36.12 |
| stress-strain relation                     | 36.6  |
| Stress-concentration                       | 28.5  |
| (charts)                                   | 28.10 |
| factor                                     | 28.9  |
| Stress concentration and notch sensitivity | 29.14 |
| Hey wood equation                          | 29.14 |
| Hey wood parameters                        | 29.16 |
| low-cycle notch sensitivity                | 29.16 |
| modified Neuber equation                   | 29.14 |
| Stress-concentration factor of Wahl        | 28.19 |
| Stress-intensity charts                    | 28.19 |
| Stress-intensity factor                    | 28.17 |
| Stress risers                              | 28.9  |
| Stress, in cylindrical shells              | 39.7  |
| analysis                                   | 39.4  |

**Index terms****Links**

|   |       |       |
|---|-------|-------|
| Stress, in flywheels:                   |       |       |
| disk of constant thickness              | 7.18  |       |
| (example)                               | 7.19  |       |
| rim type, no bending                    | 7.13  |       |
| (example)                               | 7.15  |       |
| rim type, with bending                  | 7.15  |       |
| (example)                               | 7.16  |       |
| thin disk                               | 7.17  |       |
| Stress, octahedral shear                | 28.5  |       |
| Stresses:                               |       |       |
| in fasteners                            | 22.7  | 22.10 |
| in plates                               | 22.10 |       |
| Stress-strain:                          |       |       |
| engineering                             | 32.30 |       |
| true                                    | 32.31 |       |
| Stress-strain relations                 | 36.6  |       |
| plastic strains                         | 36.12 |       |
| principal strains                       | 36.8  |       |
| Stress variation patterns, complicated: |       |       |
| characterization                        | 29.20 |       |
| Stresses in power screws:               |       |       |
| bearing                                 | 13.9  |       |
| normal                                  | 13.9  |       |
| shear                                   | 13.9  |       |
| von Mises                               | 13.9  |       |
| Stresses, interference fits             | 27.9  |       |
| (example)                               | 27.11 |       |
| Stribeck curve                          | 20.3  |       |
| Structure:                              |       |       |
| atomic                                  | 32.6  |       |
| body-centered cubic (BCC)               | 32.12 |       |

**Index terms****Links**Structure: *(Continued)*

|   |       |       |
|---|-------|-------|
| face-centered cubic (FCC)                       | 32.12 |       |
| of solids                                       | 32.3  |       |
| Structural shapes (tables)                      | A.14  |       |
| Stub Acme thread in power screws                | 13.4  |       |
| Surface endurance strength of Buckingham:       |       |       |
| load-stress factor                              | 29.33 |       |
| load-stress factor used in gear studies         | 29.33 |       |
| Surface stress, line contact:                   |       |       |
| approach of roller centers                      | 29.33 |       |
| half-width of contact zone                      | 29.32 |       |
| orthogonal normal stresses                      | 29.32 |       |
| Swift-Stieber conditions                        | 19.16 |       |
| Sylvester skew pantograph                       | 2.25  |       |
| Synchronous-belt drive                          | 14.27 |       |
| <b>T</b>  |       |       |
| Tabular method of bending deflection in shafts  | 17.5  |       |
| (table)   | 17.5  | 17.7  |
| Tabular method of combined deflection in shafts | 17.11 |       |
| (table)   | 17.12 |       |
| Tabular method of shear deflection in shafts    | 17.8  |       |
| (table)   | 17.8  | 17.10 |
| Tangent modulus                                 | 30.8  |       |
| Taper pins                                      | 24.8  |       |
| dimensions of                                   | 24.10 |       |
| Tapping screws                                  | 23.35 |       |
| Tearout stress                                  | 22.11 |       |
| Temperature:                                    |       |       |
| transition                                      | 32.45 |       |

| <b><u>Index terms</u></b>                    | <b><u>Links</u></b> |       |
|--|---------------------|-------|
| Temperature: <i>(Continued)</i>              |                     |       |
| nil-ductility                                | 32.45               |       |
| Temperature stresses                         | 36.17               |       |
| Tempered hardness                            | 33.10               |       |
| Tempering decrement                          | 33.10               |       |
| Tempering factor                             | 33.10               |       |
| Tempering temperature-time tradeoff equation | 33.29               |       |
| Tensile properties                           | 32.34               | 32.49 |
| Tensile strength:                            |                     |       |
| relation to Brinell hardness                 | 32.42               |       |
| relation to coldwork                         | 32.40               |       |
| Tensile test                                 | 28.2                | 32.27 |
| Tensile stress, definition                   | 36.6                |       |
| Tension-loaded joints:                       |                     |       |
| achieving desired preload                    | 22.29               |       |
| fastener stiffness                           | 22.18               |       |
| gasket-jointed stiffness                     | 22.20               |       |
| lower limit of clamping force                | 22.23               | 22.28 |
| preloading                                   | 22.18               |       |
| target preload                               | 22.20               |       |
| upper limit in tension                       | 22.12               | 22.24 |
| Terminology of bevel and hypoid gears        | 11.2                |       |
| Test, tensile                                | 28.2                | 32.27 |
| Testing, fatigue:                            |                     |       |
| constant-stress level method                 | 29.5                |       |
| probit method                                | 29.5                |       |
| Prot method                                  | 29.5                |       |
| sparse survey method                         | 29.4                |       |
| up-down method                               | 29.6                |       |
| Testing wear                                 | 34.12               |       |

**Index terms****Links**

## Theory:

|                   |      |
|-------------------|------|
| distortion energy | 28.5 |
| Henky-von Mises   | 28.5 |
| von Mises         | 28.5 |

## Theories of failure:

|                       |      |
|-----------------------|------|
| Coulomb-Mohr          | 28.8 |
| distortion energy     | 28.5 |
| internal friction     | 28.8 |
| maximum normal stress | 28.8 |
| modified Mohr         | 28.8 |
| octahedral shear      | 28.5 |
| von Mises             | 28.6 |

|                |       |       |
|----------------|-------|-------|
| Thermal stress | 36.16 | 36.18 |
|----------------|-------|-------|

|                         |     |
|-------------------------|-----|
| Thesaurus of Mechanisms | 2.3 |
|-------------------------|-----|

|   |      |
|---|------|
| Thread profile, unified (UN), and metric (M) series | 23.2 |
|---|------|

|                          |      |
|--------------------------|------|
| Threads, pipe            | 23.5 |
| basic dimensions (table) | 23.5 |

|               |      |
|---------------|------|
| Thermoplastic | 32.8 |
|---------------|------|

|                        |      |
|------------------------|------|
| Thermo-setting plastic | 32.9 |
|------------------------|------|

|                        |      |
|------------------------|------|
| Thick-film lubrication | 19.4 |
|------------------------|------|

|                    |       |
|--------------------|-------|
| Thick-shell theory | 39.12 |
|--------------------|-------|

|                       |      |
|-----------------------|------|
| Thin-film lubrication | 19.4 |
|-----------------------|------|

|                   |      |
|-------------------|------|
| Thin-shell theory | 39.7 |
|-------------------|------|

|  |       |
|--|-------|
| Thrust and radial loadings in rolling-contact bearings | 18.14 |
|--|-------|

|                  |     |      |
|------------------|-----|------|
| Toggle mechanism | 2.6 | 2.15 |
|------------------|-----|------|

|              |     |
|--------------|-----|
| Toggle press | 2.8 |
|--------------|-----|

|           |      |
|-----------|------|
| Tolerance | 27.2 |
|-----------|------|

## Tolerances:

|          |       |
|----------|-------|
| absolute | 27.13 |
|----------|-------|

**Index terms****Links**

|   |       |
|---|-------|
| Tolerances: ( <i>Continued</i> )                              |       |
| statistical   | 27.16 |
| on gap  | 27.17 |
| the stacking of   | 27.14 |
| Torque, actuating, in power screws                            | 13.6  |
| Torque analysis of cams                                       | 4.22  |
| Torque:   |       |
| running, of power screws                                      | 13.7  |
| starting, of power screws                                     | 13.7  |
| Torque-angle curve, flywheels                                 | 7.4   |
| engine example  | 7.6   |
| integration of  | 7.5   |
| punch-press example   | 7.4   |
| Torsion-bar springs   | 6.62  |
| Torsion springs   | 6.36  |
| Torsional stresses and angular deflection of sections (table) | 36.9  |
| Torsional shear modulus                                       | 36.8  |
| Tradeoff equation, tempering temperature-time                 | 33.29 |
| Train value   | 5.8   |
| Transition temperature  | 32.45 |
| Transport mechanisms  | 2.22  |
| Transverse shear  | 36.16 |
| Trapezoidal rule integration                                  | 7.11  |
| Travel of a power screw                                       | 13.3  |
| Triaxial:   |       |
| principal strains   | 36.8  |
| principal stresses  | 36.8  |
| Triaxial Stress   | 36.5  |
| principal stress cubic equation                               | 36.6  |

**Index terms****Links**

|  |       |
|--|-------|
| True stress                                  | 36.12 |
| conversion equations                         | 36.12 |
| Tubing, structural                           | A.15  |
| Two-parameter Weibull                        | 18.13 |
| <b>U</b>                                     |       |
| U-seals                                      | 21.13 |
| Ultimate tensile strength                    | 32.36 |
| UN (Unified-series) profile thread           | 23.1  |
| Uncertainty in machine design                | 28.5  |
| Uniform distribution in tolerances           | 27.17 |
| Unilateral hole-basis fits                   | 27.9  |
| Unloading mechanisms                         | 2.23  |
| UNR profile thread                           | 23.1  |
| Unthreaded fasteners                         | 24.1  |
| Up-down testing method                       | 29.6  |
| U S. Customary System (USCS)                 | 6.24  |
| U. S. Standards of fit, inch units           | 27.19 |
| (table), standard fits                       | 27.10 |
| <b>V</b>                                     |       |
| V engine                                     | 2.15  |
| van der Waal bonds                           | 32.6  |
| Variable loading in rolling-contact bearings | 18.15 |
| continuously varying                         | 18.15 |
| step wise varying                            | 18.15 |
| Variable-pitch spring (figure)               | 6.26  |
| Variable-pitch V belt                        | 2.28  |
| Variable-stroke engine                       | 2.16  |

| <b><u>Index terms</u></b>               | <b><u>Links</u></b> |
|---|---------------------|
| V-belt drive                            | 14.21               |
| V-belt shapes (figure)                  | 14.26               |
| Vibration:                              |                     |
| isolation                               | 31.28               |
| single degree-of-freedom systems        | 31.1                |
| systems with several degrees-of-freedom | 31.19               |
| Vibration isolation:                    |                     |
| active isolation                        | 31.28               |
| passive isolation                       | 31.29               |
| transmissibility                        | 31.28               |
| Vickers hardness                        | 32.26               |
| Viscosity:                              |                     |
| absolute                                | 20.6                |
| dynamic                                 | 20.6                |
| Engler                                  | 20.9                |
| index                                   | 20.7                |
| index improvers                         | 20.8                |
| kinematic                               | 20.6                |
| Redwood                                 | 20.9                |
| Saybolt                                 | 20.9                |
| von Mises stress                        | 29.27               |
| in power screws                         | 13.9                |
| V-ring packings                         | 21.13               |
| <b>W</b>                                |                     |
| W shapes                                | A.23                |
| Wahl stress-concentration factor        | 6.19                |
| Washers:                                |                     |
| types                                   | 24.26               |
| Watt linkage                            | 2.25                |

| <b><u>Index terms</u></b>                          | <b><u>Links</u></b> |
|--|---------------------|
| Wear equation                                      | 34.6                |
| linear   | 34.13               |
| Wear failure, modes of                             | 34.11               |
| Wear life  | 34.1                |
| Weibull parameters in rolling-contact bearing life | 18.10               |
| Weight, atomic                                     | 32.4                |
| Weld metal, allowables for                         | 26.42               |
| Welding ( <i>see</i> Arc welding)                  |                     |
| Welding codes                                      | 26.39               |
| Welding current limitations                        | 26.5                |
| Whitworth quick-return mechanism                   | 2.16                |
| Wire, spring:                                      |                     |
| rectangular  | 6.24                |
| round  | 6.7                 |
| strength of  | 6.11                |
| Woodruff key, dimensions                           | 24.25               |
| Work, cold ( <i>see</i> Cold work)                 |                     |
| Work hardening ( <i>see</i> Strain strengthening)  |                     |
| Worksheet, heat-treated steels                     | 33.30               |
| Worksheet:   |                     |
| absolute tolerance                                 | 27.16               |
| for heat treated steels                            | 33.30               |
| Worm gearing:                                      |                     |
| design standards                                   | 12.13               |
| double-enveloping gearsets                         | 12.18               |
| force analysis                                     | 12.5                |
| heat dissipation                                   | 12.12               |
| kinematics   | 12.3                |
| velocity and friction                              | 12.5                |

**Index terms****Links**

| <b>Y</b>                                     |       |       |
|--|-------|-------|
| Yield strength                               | 32.36 | 32.39 |
| relations to coldwork                        | 32.39 | 33.3  |
| tabulations ( <i>see</i> Tensile properties) |       |       |
| Young's modulus                              | 32.35 |       |
| <br>   |       |       |
| <b>Z</b>                                     |       |       |
| Zerol gears                                  | 11.1  |       |
| Zoller mechanism                             | 2.15  |       |