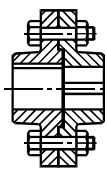


CONTENTS

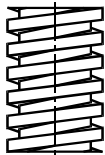


Chapter 1 **Shafts, Keys and Couplings**

1 - 158

1.1	Transmission Shafts	2
1.2	Design Based on Strength	2
1.3	Design Based on Torsional Rigidity	4
1.4	ASME Code of Design of Shafts	5
1.5	Solved Examples	7
1.6	Design Based on Lateral Rigidity or Deflection	75
1.7	Castigliano's Theorem for Determining Deflection	76
1.8	Solved Examples	77
1.9	Keys	89
1.10	Design of Square and Rectangular Keys	94
1.11	Solved Examples	97
1.12	Design of Kennedy Key	108
1.13	Solved Example	109
1.14	Design of Splines	110
1.15	Solved Examples	112

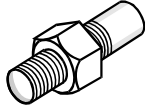
1.16	<i>Couplings</i>	115
1.17	<i>Muff Coupling or Sleeve Coupling</i>	116
1.18	<i>Clamp Coupling</i>	126
1.19	<i>Flange Coupling</i>	131
1.20	<i>Pin Bush Coupling</i>	142
	<i>Keypoints</i>	152
	<i>Exercises ?</i>	153
	<i>Problems</i>	154



Chapter 2 **Power Screws**

159 - 244

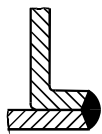
2.1	<i>Introduction</i>	160
2.2	<i>Forms of Threads</i>	160
2.3	<i>Multiple Start Threads</i>	164
2.4	<i>Hand of Threads</i>	164
2.5	<i>Force Analysis of Square Threads</i>	165
2.6	<i>Over-Hauling and Self-Locking Screws</i>	167
2.7	<i>Efficiency of Screw Threads</i>	168
2.8	<i>Analysis in case of V-Threads</i>	170
2.9	<i>Collar Friction</i>	171
2.10	<i>Coefficient of Friction in Power Screws</i>	172
1.11	<i>Solved Examples</i>	173
1.12	<i>Stresses in Power Screws</i>	181
2.13	<i>Solved Examples</i>	183
2.14	<i>Screw Jack</i>	215
2.15	<i>Solved Examples</i>	216
2.16	<i>Differential and Compound Screws</i>	234
2.17	<i>Solved Examples</i>	235
	<i>Keypoints</i>	239
	<i>Exercises ?</i>	240
	<i>Problems</i>	241



Chapter 3
Threaded Joints

245 - 340

3.1	Threaded Joints	246
3.2	Basic Types of Screw Fastenings	247
3.3	Types of Cap and Set Screws	253
3.4	Types of Nut Locking Arrangements	255
3.5	Bolts of Uniform Strength	257
3.6	Solved Examples	258
3.7	ISO Metric Screw Threads	259
3.8	Bolts under Tension	261
3.9	Design of Cylinder Bolts	263
3.10	Solved Examples	268
3.11	Eccentrically Loaded Joints when Load is Parallel to the Bolt Axis	274
3.12	Eccentrically Loaded Joints when Load is Perpendicular to the Bolt Axis	277
3.13	Solved Examples	279
3.14	Eccentrically Loaded Bolts in Shear	308
3.15	Solved Examples	310
3.16	Torque Requirement for Bolt Tightening	324
3.17	Solved Examples	325
3.18	Design of Coupler or Turn buckle	327
3.19	Dimensions of Standard Fasteners	332
	Keypoints	334
	Exercises ?	334
	Problems	335



Chapter 4
Welded Joints

341 - 400

4.1	Welding Process	342
4.2	Advantages and Disadvantages of Welded Joints	343
4.3	Types of Welded Joints	343

4.4	<i>Welding Symbols</i>	344
4.5	<i>Stresses in Butt Welds</i>	349
4.6	<i>Stresses in Fillet Welds</i>	350
4.7	<i>Axially Loaded Unsymmetrical Welded Joints</i>	355
4.8	<i>Solved Examples</i>	356
4.9	<i>Eccentrically Loaded Welded Joints</i>	360
4.10	<i>Solved Examples</i>	362
4.11	<i>Welded Joints Subjected to Torsional Moments</i>	382
4.12	<i>Solved Examples</i>	383
4.13	<i>Welded Joints Subjected to Combined Loading</i>	385
4.14	<i>Solved Examples</i>	386
	<i>Keypoints</i>	395
	<i>Exercises ?</i>	395
	<i>Problems</i>	396

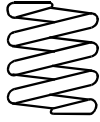


Chapter 5

Design of Flywheel

401 - 484

5.1	<i>Flywheel</i>	402
5.2	<i>Flywheel Torque Analysis</i>	403
5.3	<i>Types of Flywheels</i>	406
5.4	<i>Stress Analysis in a Flywheel Rim Neglecting the Effect of Spokes</i>	407
5.5	<i>Solved Examples</i>	408
5.6	<i>Stress Analysis in the Rim of the Flywheel having Spokes (Approximate Analysis - Lanza Equation)</i>	438
5.7	<i>Stresses in Flywheel Arms</i>	441
5.8	<i>Construction and Standard Dimensions of Flywheels</i>	442
5.9	<i>Solved Examples</i>	446
5.10	<i>Stress Analysis in Solid Flywheels</i>	471
5.11	<i>Solved Examples</i>	472
	<i>Keypoints</i>	482
	<i>Exercises ?</i>	482
	<i>Problems</i>	483

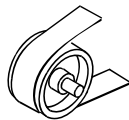


Chapter 6

Mechanical Springs

485 - 544

6.1	Types of Springs	486
6.2	Spring Materials	486
6.3	Helical Spring Ends and Terminology	490
6.4	Helical Springs - Stress and Deflection	493
6.5	Springs in Series and Parallel	496
6.6	Solved Examples	498
6.7	Concentric Springs	518
6.8	Solved Examples	519
6.9	Helical Torsion Springs	531
6.10	Solved Examples	533
6.11	Multi-leaf Springs	536
6.12	Energy Stored in Springs	537
6.13	Shot Peening	540
	Keypoints	541
	Exercises ?	541
	Problems	542



Chapter 7

Belt and Rope Drives

545 - 642

7.1	Belt Drives	546
7.2	Flat Belt - Construction and Materials	547
7.3	V-belt - Construction and Materials	548
7.4	Comparison of Flat Belts and V-belts	549
7.5	Law of Belting and Types of Belt Drives	549
7.6	Geometric Relation for an Open Belt Drive	554
7.7	Geometric Relation for a Crossed Belt Drive	556
7.8	Force Analysis of Flat Belts	558

7.9	Virtual Coefficient of Friction in V-belts	560
7.10	Conditions for Maximum Power Transmission	561
7.11	Relation Between semi-angle of Wrap and Tension Ratio	563
7.12	Stress Distribution in Flat Belts	565
7.13	Concept of Slip in belts	566
7.14	Solved Example	569
7.15	Phenomenon of Creep in Belts	570
7.16	Solved Examples	570
7.17	Flat Belt Selection from Manufacturer's Catalog	598
7.18	Solved Examples	601
7.19	V-belt Selection from Manufacturer's Catalog	605
7.20	Solved Example	611
7.21	Belt tensioning Devices	613
7.22	Solved Examples	615
7.23	Construction and Applications of Timing Belts	621
7.24	Rope Drives	622
7.25	Construction and Lay of Wire Ropes	622
7.26	Stresses in Wire Ropes	623
7.27	Solved Examples	627
7.28	Rope Drum Construction and Design	632
7.29	Solved Example	634
	Keypoints	636
	Exercises ?	637
	Problems	638

USEFUL
DATA

Appendix

i - viii

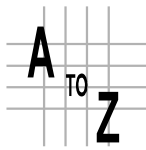
A1.	Materials and Their Properties	ii
	Table A1-1 : Physical Constants of Typical Materials	ii
	Table A1-2 : Properties of Cast Iron	iii
	Table A1-3 : Properties and Applications of Typical Steels ...	iii
	Table A1-4 : Properties of Stainless and Heat Resistant Steels	iv
	Table A1-5 : Properties of General Use Cast Steels	vi
	Table A1-6 : Properties of High Tensile Cast Steels	vi

*Table A1-7 : Properties and Typical Uses of
Aluminium Wrought Alloys vi*

*Table A1-8 : Properties and Typical Uses of
Aluminium Cast Alloys vii*

Table A1-9 : Typical Copper Alloys and their Applications. . viii

Table A1-10 : Physical Properties of Brass viii



Alphabetical Index

ix - xii