

Figures	v	
Foreword	vii	
Acknowledgments	ix	
Units of Measurement	x	
Introduction	i	
The Hoisting System	2	
Derricks and Masts	4	
Blocks and Drilling Line	4	
Drawworks	5	
To summarize	6	
Components of the Drawworks	7	
Frame	9	
Drum	9	
Catshaft	10	
Transmission	10	
Rotary Drive Countershaft	11	
Brakes	11	
To summarize	12	
Getting Power to the Drawworks	13	
Mechanical and Electric Drives	13	
Comparison of Electric and Mechanical Drives	15	
To summarize	16	
Transmissions	17	
Compounding Transmission	17	
Design of the Compound	21	
Selective Transmission	26	
To summarize	30	
Construction of Chains and Sprockets	31	
To summarize	40	
Installing Chain	41	
To summarize	46	
Lubrication of Chain-and-Sprocket Drives	47	
To summarize	52	
Maintenance of Chain-and-Sprocket Drives	53	
To summarize	60	
Clutches	61	
Locations	61	
Positive Clutches	62	
Friction Clutches	64	
Overrunning Clutches	66	
Installation	67	
Maintenance	68	
To summarize	69	
Main Brake	70	
Design	70	

Contents



Operation	73	
To summarize	78	
Maintenance	79	
Brake Flanges	82	
To summarize	84	
Auxiliary Brake	85	
Hydrodynamic Brake	86	
Electrodynamic Brake	88	
To summarize	90	
Catshaft	91	
Catheads	92	
Sand Reel	95	
To summarize	96	
Lubrication	97	
To summarize	98	
Glossary	99	
Review Questions	III	
Answers to Review Questions		123

1.	Windlass	1
2.	Hoisting with a pulley and line	2
3.	Hoisting system	3
4.	Drawworks	5
5.	Drawworks with guards removed	8
6.	Drawworks drum	9
7.	Prime movers and compound in a mechanical drive	14
8.	Diesel engine and generator in an electric drive system	14
9.	Compound for two engines	15
10.	Hydraulic torque converter	18
11.	Waterwheel	19
12.	Hydraulic coupling and torque converter	20
13.	View of the compound from above	21
14.	Sprocket	22
15.	Chain-and-sprocket drive	22
16.	Multistrand drives	24
17.	Gears	26
18.	Power flow diagram of the selective transmission	28, 29
19.	Roller links and pin links	31
20.	Roller chain	32
21.	Connector links	33
22.	Offset link	33
23.	Multistrand chain	34
24.	Dimensions of a link	35
25.	Broken pin	37
26.	Broken link plate	37
27.	Chain case and chain guard	39
28.	Measuring the catenary on a chain	42
29.	Chain with too much slack	43
30.	Angular misalignment	44
31.	Offset misalignment	45
32.	Checking for misalignment and levelness of shafts	46
33.	Cross section of two-strand chain showing lubrication	47
34.	Drip lubrication	48
35.	Oil bath lubrication	49
36.	Slinger disk lubrication	49
37.	Pressure lubrication	50

Figures



38.	Best location to apply lubrication	50
39.	Measuring chain for elongation	55
40.	Worn sprockets	55
41.	Positive clutches	62
42.	Friction clutches	65
43.	Overrunning clutch	66
44.	Main (mechanical) brake	71
45.	Braking capacity increases from the live end to the dead end	73
46.	Comparing the diameter of the drum to the rims	74
47.	Comparing the width of the brake band	75
48.	Angle of wrap of 270°	75
49.	Cross section of the brake rim	76
50.	Checking the band for roundness	80
51.	Measuring scoring in the brake rim	82
52.	Hydrodynamic brake	86
53.	Electrodynamic brake	88
54.	The catshaft, catheads, and sand (coring) reel from the rear of the drawworks	91
55.	Air tugger	93
56.	Grease fitting locations	97

Tables



1.	Common chain sizes	36
2.	Maximum chain speeds for different lubrication methods	48
3.	Elongation limits for chain	54
4.	Roller chain troubleshooting guide	57