I SHIPBOARD PRACTICE

# SEANIANS EIGENICES

COMBINED VOLUME SECOND EDITION

DJHOUSE

2 SHIP HANDLING

# SEAMANSHIP TECHNIQUES

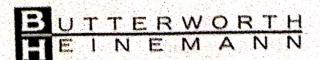
## SECOND EDITION



PART ONE: SHIPBOARD PRACTICE

PART TWO: SHIP HANDLING

D. J. HOUSE



OXFORD AMSTERDAM BOSTON LONDON NEW YORK PARIS SAN DIEGO SAN FRANCISCO SINGAPORE SYDNEY TOKYO

Butterworth-Heinemann Linacre House, Jordan Hill, Oxford OX2 8DP 200 Wheeler Road, Burlington, MA 01803 A division of Reed Educational and Professional Publishing Ltd

First published as two volumes 1987 Volume 1 first published as paperback 1989 Volume 2 first published as paperback 1990 Single volume edition 1994 Reprinted 1995, 1997, 1998, 1999 (twice) Second edition 2001 Reprinted 2003

Copyright © 1987, 1994, 2001, D. J. House. All rights reserved.

No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication) without the written permission of the copyright holder except in accordance with the provisions of the Copyright, Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency Ltd, 90 Tottenham Court Road, London, England W1P 0LP. Applications for the copyright holder's written permission to reproduce any part of this publication should be addressed to the publishers.

Permissions may be sought directly from Elsevier's Science and Technology Rights Department in Oxford, UK: phone: (+44) (0) 1865 843830; fax: (+44) (0) 1865 853333; e-mail: permissions@elsevier.co.uk. You may also complete your request on-line via the Elsevier Science homepage (http://www.elsevier.com), by selecting 'Customer Support' and then 'Obtaining Permissions'.

ISBN 0 7506 5231 4

## **British Library Cataloguing in Publication Data**

House, D. J.

Seamanship techniques, - 2nd ed.

- 1. Seamanship
- I. Title II. Shipboard practice III. Ship handling 623.8'8

Library of Congress Cataloguing in Publication Data A catalogue record for this book is available from the Library of Congress

For information an all Butterworth-Heinemann publications visit our website at www.bh.com

Typeset in Replika Press Pvt Ltd, 100% EOU, Delhi 110 040 Printed and bound by Martins the Printers Ltd, Berwick upon Tweed

# ABBREVIATIONS



(Marine abbreviations used in this text and within the marine industry)

ABS A.C.	American Bureau-of Shipping Alternating Current	DSC (ii) DWT (I	Digital Selective Calling DW) Deadweight
AHV	Anchor handling vessel	ECDIS	
AIS	Automatic Identification	ECDIS	Electronic Chart Display
	System	EFSWR	Information System
AMVER	Automated Mutual Vessel	LISWK	Extra Flexible Steel Wire
	Rescue system	ENC	Rope
ARCs	Admiralty Raster Charts	EPIRB	Electronic Navigation Chart
ARPA	Automatic Radar Plotting Aid	LING	Emergency Position
AUSREP	Australian Ship Reporting	ETA	Indicating Radio Beacon Estimated Time of Arrival
	system	2171	Estillated Time of Arrival
		FRC	Fast Rescue Craft
B.S.	Breaking Strain	FSM -	Free Surface Movement
BV	Bureau Veritas	FSWR	Flexible Steel Wire Rope
		FWA	Fresh Water Allowance
CABA	Compressed Air Breathing		
-	Apparatus	GHz	gigahertz
CES	Coast Earth Station	GM	Metacentric Height
CG	Coast Guard	GMDSS	Global Maritime Distress and
CMS	Constantly Manned Station		Safety System
CO <sub>2</sub>	Carbon Dioxide	GMT	Greenwich Mean Time
C of B (B)		GPS	Global Positioning System
C of G (G)	Centre of Gravity	GT (g.t.)	Gross Tons
CPP	Closest Point of Approach	GZ	Righting Lever
CQR	Controllable Pitch Propeller Chatham Quick Release	HF	High Frequency
CRS	Coast Radio Station	HLO	Helicopter Landing officer
CS	Coast Station	HMS	Her Majesty's Ship
		HMSO	Her Majesty's Stationery Office
DC	Direct Current	HRU	Hydrostatic Release Unit
DGPS	Differential Global	HSC	High Speed Craft (code)
1	Positioning System		
DNV	Det Norske Veritas	IAMSAR	International Aeronautical
DRHQ	Divisional Rescue Head	4.84%	and Maritime Search and Rescue Manual
DSC (i)	Quarters  Dynamically Supported Craft	ICAO	International Civil Aviation
1 - (1)	(hydrofoils)		Authority

YOC	International Chamber of	NUC	Not Under Command
ICS		NVE	
****	Shipping	INVL	Night Vision Equipment
IHO	International Hydrographic	OiC	Officer in Channe
	Office		Officer in Charge Officer of the Watch
IMDG	International Maritime	OOW	
	Dangerous Goods Code	OSC	On Scene Co-ordinator
IMO	International Maritime	T (4	
	Organisation	P/A	Public Address System
ISM	International Safety		
	Management	RN	Royal Navy
ITU	International	RNR	Royal Naval Reserve
	Telecommunications Union	RoPax	Roll on/Roll off + Passenge
		RoT	Rate of Turn
KB	Measured distance between	Ro-Ro	Roll on, Roll off
	the keel and the ships centre	rpm	Revolutions per minute
	of buoyancy	R/T	Radio Telephone
KG	Measured distance between	Rx	Receive
RO	the keel and the ships centre		
	of gravity	SAR	Search and Rescue
kg	kilogram	SARSAT	Search and Rescue Satellite
kHz	kilohertz	SART	Search and Rescue Radar
kJ	kilo Joule		Transponder
KM	Measured distance between the	SES	Ship Earth Station
	keel and the ships metacentre	SOLAS	Safety of Life at Sea
kN	kilo Newton		(convention)
kW	kilowatt	SOPEP	Ships Oil Pollution
			Emergency Plan
lbs .	pounds ,	SPM	Single Point Mooring
LBP	length between	STCW	Standards of Training,
	perpendiculars		Certification and
LCB	Longitudinal Centre of		Watchkeeping (convention)
	Buoyancy	SWL	Safe Working Load
LFL	Lower Flammable Limit	SWR	Steel Wire Rope
LNG	Liquid Natural Gas	TD	T
LOA	length over all Lloyds Register	T.D. TMC	Tonnage Deck
LR LUT	Land User Terminal	TWIC	Transmitting Magnetic Compass
LOI	Earld Osci Terrimian	TRS	Tropical Revolving Storm
MA	Mechanical Advantage	110	Tropical Revolving Storm
MAIB	Marine Accident	UFL	Upper Flammable Limit
	Investigation Branch	UHF	Ultra High Frequency
MARPOL		U.K.	United Kingdom
	Convention	UKC '	Under Keel Clearance
mbs	millibars	ULCC	Ultra Large Crude Carrier
MCA	Maritime and Coastguard	U.S.	United States
MEC	Agency  Marine Evacuation Chute	USCG	United States Coast Guard
MES	Marine Evacuation System	VCG	Vertical Centre of Gravity
MGN	Marine Guidance Notice	VDR	Voyage Data Recorder
MHz	megahertz	VDU	Visual Display Unit
MIN	Marine Information Notice	VHF	Very High Frequency
MN	Mercantile Marine	VLCC	Very Large Crude Carrier
MNTB	Merchant Navy Training Board	VTMS	Vessel Traffic Management
M₀B MPCU	Man overboard	verc	System Vessel Traffic System
MRCC	Marine Pollution Control Unit  Marine Rescue Co-ordination	VTS	resser manager
	Centre	W/L	Waterline
MSI	Marine Safety Information	WNA	Winter North Atlantic
MSN	Merchant Shipping Notice	Wps	wires per strand Wireless Telegraphy
	(previous 'M' notice)	W/T	wheress relegiabily

# PART ONE

# SHIPBOARD PRACTICE

# CONTENTS TO PART ONE



	Abbreviations	V
	Preface	xiii
	Acknowledgments	xiv
	List of plates	xv
	List of tables	xvii
1.	THE SHIP	
	Introduction .	1
. 10	Terms and definitions	1
	Terms and definitions concerning stability	5
1	Varieties of ship	6
	Plate and construction terms	6
	Main structural members – compensating stress factors	
	affecting vessel	19
571	Stresses in ship structures	20
. 13	Loadlines	22
2.	'ANCHOR WORK	
	Anchors	25
	Tests on anchors	27
	Marks on anchors	29
	Anchor certificate	29
	Chain cable tests	29
	Notes on cable	30
	Kenter lugless joining shackle	30
	'D' lugged joining shackle	32
	Securing and stowage of anchors	33
	Securing anchor and cable	33
	Steam windlass operation	34
	Preparing anchor for 'letting go'	34
	Cable holders	35
	Procedure for coming to anchor	36

#### Contents to Part One

Clearing away anchors	40
Anchor terminology	41
Watch at anchor	46
Deep water anchoring	49
Laying/carrying out anchors	49
Clearing a foul hawse	50
To weigh anchor by deck tackle	52
	52
Anchor recovery – loss of windlass power	53
Hanging off an anchor	55
Lost anchor and re-securing of spare anchor	
Mooring anchors	57
3. ROPEWORK	
Natural fibre ropes	59
Lay of rope	62
Small stuff	63
Synthetic fibre ropes	65
Bends and hitches	67
Working aloft and overside	71
Seizings	73
Ropework and cordage tools	74
Worming, parcelling and serving	75
Cordage splice	76
Whippings	77
Marrying two ropes together	78
To pass a stopper	79
Breaking out mooring rope	81
4. WIREWORK AND RIGGING	
Steel wire rope	
Steel wire rope rigging	82
Rigging fitments	86 91
Wire splicing	93
Stowage of wire hawsers	96
Safe handling procedures for wire rope	96
Mousing a hook or shackle pin	97
Blocks - care and maintenance	98
Blocks and tackles	100
5. LIFTING GEAR	
Derricks Union purchase	106
Union purchase Safe handling practice for derricks	- 112
Doubling-up procedure	113
Butterfly rig	113
Yo-Yo rig	114
Hallen universal derrick	115
Hallen container derrick	116

#### Contents to Part One

	Velle shipshape crane	117
	Heavy lift procedures	118
	Cranes	121
	Cranes and derricks - advantages and disadvantages	124
	Derrick tests and surveys	125
	Rigging of sheer legs	125
	Rigging of gyn	127
	Hand signals	127
	Calculating stresses in derricks by empirical formula	127
	,	127
6.	CARGO AND HATCHWORK	
	Conventional hatch	142
	Conventional hold	145
	Steel hatch cover	146
	General cargo terminology	152
	Duties of junior cargo officer	153
	Hold preparation	154
	Stowage methods	155
	Cargo handling .	156
	Ventilation	, 158
	Refrigerated cargoes	158
	Carriage of goods in deep tanks	160
	Container tonnage .	162
	Roll on-roll off system	162
	Cargo plans	164
		101
7.	BOATWORK	
	Parts of the lifeboat	168
	Types of wood construction	171
	Boat fitments	172
	Totally enclosed survival craft	180
1	Partially enclosed boats	186
	Boat rigging	188
	Launching procedure	191
	Taking boat away from ship's side	196
	Boat recovery in heavy weather	197
	Beaching lifeboat	198
	Boat handling and safe procedures	200
	Markings on sails Sail theory	201
	Sail terminology	201
	가는 물에도 마음이 모든 것은 가장님들은 말로 하루면 중인하는 것은 것은 사람들이 가장하고 있다면 모든 것이 모든 것이다. 전 하는 것이다는 것은 것이다.	203
8.	SURVIVAL CRAFT AND PRACTICE	
	Survival systems international	204
	The Inflatable life raft	204
	Launching inflatable life raft	211
	Doarding raft	212
	Rigid life rafts	212
1997	그리다 그는 그리고 있다면 하는 것은 아이들은 사람들이 모든 사람들이 모든 사람들이 되었다면 하는 것이 되었다면 하는데 그리고 있다면 하는데 하는데 되었다면 되었다면 하는데 되었다면 하는데 되었다면 되었다면 하는데 되었다면 되었다면 하는데 되었다면 하는데 되었다면 되었다면 되었다면 되었다면 되었다면 되었다면 하는데 되었다면 되었다면 되었다면 되었다면 되었다면 되었다면 되었다면 되었다면	Circle Very bird of A.

# Contents to Part One

The davit launched life raft	214
Additional fitments to raft	221
Abandoning ship	222
Marine evacuation system	225
Evacuation-slide launching and embarkation	225
Righting capsized life raft	227
Beaching a life raft	227
9. COMMUNICATIONS	
Methods employed in marine industry	245
Flag signalling terms	249
Single letter meanings - International Code of Signals	250
Signalling by International Code flags	250
Important two-letter signals	255
Sample messages employing International Code of Signal	s 256
Flag maintenance	256
Wearing of ensigns	257
Morse code procedure - signalling by flashlight	260
Morse code regular procedural signals	262
Morse code signalling by hand flags or arms	262
APPENDIX:	24.
Seaman's self-examiner	264
Efficient deck hand examination	264
Certificate of Proficiency in Survival  Craft and Rescue Boats	266
Clair and Rescue Doars	200

#### INDEX TO PART ONE



Abandon ship, 222 Abandon ship drill, 242 Abeam, 1, 2 Ahead, 2 Alarm signals, 240 Alternative tonnage mark, 23 Amidships, 2 Anchor and cable certificates, 29, 30 Anchor and cable construction, 26-31 Anchors and cable work, 25 Anchor cable securement and fittings, 30 - 35bitter end, 34, 41 bow stopper, 33, 37. cable holder, 38 cable joining shackles, 30-33, 40 'D' Lugged, 32, 33 Kentor Lugless, 30, 31 cable locker, 33, 34 chain reliever, 38 compressor, 33, 35 devils claw, 33, 38 guillotine, 35 gypsy, 33, 36 hawse pipe, 33, 34 lashings, 37-41 scotsman, 38 snug, 35, 38 spurling pipe (naval pipe), 33, 35, 45 swivel, 33 windlass and capstans, 35-37 Anchor moorings, 57, 58 Bruce, 57 improved mooring, 58 Trotman anchor, 58 Anchor operations, approach plan, 38, 39 bell signals, 40

'A' Frame, 6

clearing foul hawse, 43, 50-52 deep water anchoring, 49 hanging off anchor, 54, 55 laying or carrying out anchors, 49, 50 marking cable, 40 recovery, 52, 53 re-securing spare anchor, 55-57 single anchor procedure, 39 Anchor parts, 25-27 anchor crown 'D' shackle, 33 arms, 25, 26 crown, 25, 26 flukes, 25, 26 forelock, 25 gravity band, 25 head...of anchor, 26. pea or bill, 25 shank, 25, 26 stock, 25, 26 tripping palms Anchor terminology, 41-46 anchor 'a' cock a bill, 41 anchor aweigh, 41 anchor buoy, 41 anchor coming home, 42 anchor dragging, 42 anchor warp, 42 brought up, 42 cable clench, 42 cable length, 42 cat an anchor, 42 drop an anchor under foot, 42 foul anchor, 43 foul hawse, 43 cross, elbow, round turn, 43 ganger length, 54 grow, 43 gypsy, 43

hawse pipe, 34, 43

hove in sight, 43 joggle shackle, 44 kedging, 44 long stay, 44 ream out a shackle, 44 render cable, 44 scope, 44 shackle of cable, 44 sheer, 44 sheet anchor, 45 shorten cable, 45 short stay, 45 snub, 45 spurling pipe, 45 surge, 45 tiderode, 45 up and down, 45 veer cable, 45 walk back, 45 windlass brake, 34, 35 yaw, 46 Anchor tests, 27, 29 bending test, 29 drop test, 27 percussion test, 27 proof loads, 28 Anchor types, 25 Admiralty cast, 25 Admiralty pattern, 25 CQR, 26, 27 Danforth, 26, 27 Fishermans anchor, 25 Stockless anchor, 26 Anchor watch, 46 dragging anchor, 46, 47 duty of OOW, 46, 47 transit bearings, 47 Anchor work accessories, 38 cable jack, chain hook, drifts, 38

Angle bar, 20	Block internal fitments, 99	mast thwart, 188
Answering pennant, 252, 253	Block parts of, 98, 99	painter shackle, 168
Apron, 168	arse, 98	rising, 168
Awning screw, 89	binding, 99	rubbing strake, 168, 172
	bush, 99	scarph, 168
	cheeks/plates, 99	sheer strake, 168
Bagged cargo, 155	cross head, 99, 100	side bench, 168, 172
Bailer, 174	crown head, 98	sling plate, 168
Bale sling strop, 72, 156, 157	distance piece, 99	stem post, 168
Bale space, 152	inspection plate, 98	stem band, 168
Ballast, 21		stern band, 168
Ballast tank, 7	pin (bolt), 98, 99	
Band brake, 35	rope guards, 99	stern post, 168
Barrel sling, single, double, 72	sheave, 98, 99	stretcher, 172
7	swallow, 98	tank cleading, 168, 172
	swivel hook/becket, 98–100	thwart, 168, 172
Beaching, 198, 199	Block inspection, 98, 99	thwart knees, 168, 172
lifeboat, 198	lubrication, 98	timber (ribs), 168
liferaft, 227	protection, 98	Boat equipment, 172, 174-177
Beam, 2, 4	order new, 98	axes, 174
Beam knees, 19	Block maintenance, 96	bailer, 174
Beams, 19	Blocks and tackles, 100–105	boat hooks, 174, 176
Bends and hitches, 67–81	Block types, 98	buckets, 174
blackwall hitch, 67	chain blocks, 103–105	compass, 175
bowline, 67, 68	external bound, 99	crutches, 172
running bowline, 67, 68	gin, 99	dippers, 176
bowline on the bight, 67, 68	head block, 100	drinking vessels, 176
catspaw, 69	heel block, 100	engine tools, 175
clove hitch, 69	internal bound, 99	exposure cover, 175
cow hitch, 69	metal block, 99	fire extinguisher, 175
diamond carrick bend, 69	snatch block, 99	first aid outfit, 176, 211
double blackwall hitch, 67	wood block, 98	fishing tackle, 176
double carrick bend, 69	Blue ensign, 258, 259	heliograph (daylight signal mirror).
double sheet bend, 71	Boat construction, 168	174, 209
figure '8' knot, 69, 70	carvel, 171	jack knife, 174
fishermans bend, 70	clinker, 171	manual pump, 174
french bowline, 68	double diagonal, 171, 172	oars, 174
marline spike hitch, 69, 70	GRP(Glass reinforced plastic), 172	oil bag, 175
midshipmans hitch, 70	Parts of a lifeboat, 168	painters, 175, 188
reef knot, 70, 71	Apron, 168	pyrotechnics, 174
rolling hitch, 70	bilge grabrail, 168, 172	radar reflector, 175
round turn and two half hitches, 70,	bottom boards, 172	rations, 176
71	buoyancy chambers, 168, 172	rescue coit, 174
sheep shank, 71	deadwood, 168	rescue signal table, 175, 177
sheet bend, 71	filling piece, 168	sea anchor, 174, 175
single carrick bend, 68, 69	gangboard, 168	search light, 176
timber hitch, 70, 71	garboard strake, 168	steering oar, 174
Bilge pumping arrangement, 7	gunwale, 168, 169, 172	survival manual, 174
Bilge suction, 145, 146	gunwale capping, 168	thermal protective aids, 176
Bilge turn of, 145	hardwood chock, 168	torch, 174
Binding, 98, 99	hog piece, 168	water container, 173, 176
Bitts, 35, 67	keel, 168, 172	whistle, 174
Blake slip, 91, 92	keelson, 168	Boat fitments, 172, 186
Block coefficient, 4, 5	lifting hooks, 168, 172	automatic bailing, 187

Boat fitments (Contd)	Bulb angle/plate, 20	Cheese rope, 81
drain valves, 186	Bulk cargoes, 146, 155	Chemical carrier
lamp, 187	coal, 155	Chinese stopper
lifeboat engine, 178, 179	edible oil, 155	Clear, 93
mast and sails, 188	scrap metal, 150	Clew, 201
rowlocks, 172	deep tank stowage, 146	Clinker, 171
rudder and tiller, 187	Bulk carrier, 12	Close up, 203
skates, 173	Bulkhead, 19	Close reach, 203
thole pins, 173	collision, 4, 6	Clove hitch, 69
watertight lockers, 173	Bulldog (rope) grip, 90	Coefficient of fin
Boat launching procedures, 183, 191-195	Bulwark, 17	Coffin plate, 6
boat operations, 196	Bull wire, 107, 146	Coir rope, 61
beaching, 198, 199	Butterfly rig, 113, 114	Collision bulkhea
boat handling, 200		Common link, 33
boat recovery, 197, 198	·	Common whipping
goose winging, 202, 203	Cable, 29, 33	Communications,
gybing, 202	clench, 38, 42	Compressor, 33, 3
heaving to, 175	drum, 33, 38	Conical sockets, 9
reefing, 202, 203	holder, 35, 38	Container tonnag
running, 202	jack, 38, 42	Conventional hate
sail terms, 6, 203	laid rope, 62	Copra, 155
sail theory, 201–203	locker, 33, 34	Courtesy ensign,
tacking, 201	locker lashing, 41	Cow hitch, 81
wearing, 201, 202	Camber, 2, 3	Cowl ventilator, 1
Boat rigging, 188	Cantons, upper and lower, 257	Coxwain's respons
buoyant lifeline, 189	Capstan, 37	CQR anchor, 25,
bowsing tackles, 190	Cargo handling procedure, 156	Cranes, 121, 122
gripes, 191	can hooks, 159	Cross, 43
keel grab lines, 189	nets, 157	Cross head, 90
lifeboat falls, 86, 88, 189, 190	plans, 164	Cross lay, 84
lifelines, 189	plate clamps, 157, 158	Crown, 26
mast and sail rig, 188	runner, 107, 108, 110, 113	Crutches, 172
painters, 188, 189	slings, 157, 158, 159	
tricing pennants, 190, 191	snotters, 156	Danforth anchor,
	timber dogs, 157, 158	Dangers-open bo
Boatwork, 166 access into lifeboats, 167	vessel, 7, 17	Davit launched life
lifeboat buoyancy, 167	working, 153–165	Davits, 169, 185, 1
lifeboat construction, 166, 168	Carrick bend, 68, 69	Deadweight, 6
lifeboat markings, 168	Carvel, 171	Deadweight cargo
	Catspaw, 69	Deadwood, 168
Bolster, 34	Ceiling, 17, 145	Deck, 4
Booby hatch, 144	Cellular double bottom, 7, 145	Deck cranes, 121,
Boom, 106	Centre of buoyancy, 5	Deep tanks, 146
Boss plate, 6 Bosuns chair rigging, 71, 73	Centre of floatation, 5	Deep tank cargo,
Bottle screws, 89, 90	Centre of gravity, 5	coconut oil, 16
Boulevant eye splice, 93–96	Chain block, 103–105	tallow, 161, 162
Bow stopper, 33, 35, 37	Chain cable, 29, 31	whale oil, 161,
Bow visor, 163	hook, 38, 42	Deep water ancho
Breadth, 3	tests, 29	Depth, 3
Breaking stress	types, 30	Derricks, 106
(cordage, wire, and chain), 83	Chain preventor, 107	calculations, 12
Broken stowage, 152	Channel bar, 20 Cheek plates, 99	crutch, 108, 10
Bruce anchor, 57, 58	Check place,	

Chemical carrier, 11
Chinese stopper (West Country), 80
Clear, 93
Clew, 201
Clinker, 171
Close up, 203
Close reach, 203
Clove hitch, 69
Coefficient of fineness, 5
Coffin plate, 6
Coir rope, 61
Collision bulkhead, 4
Common link, 33, 40
Common whipping, 77, 78
Communications, 245
Compressor, 33, 35
Conical sockets, 90
Container tonnage, 162
Conventional hatch, 142, 143
Copra, 155
Courtesy ensign, 258
Cow hitch, 81
Cowl ventilator, 159
Coxwain's responsibilities, 192, 200
CQR anchor, 25, 26
Cranes, 121, 122
Cross, 43
Cross head, 90
Cross lay, 84
Crown, 26
Crutches, 172

Danforth anchor, 26, 27
Dangers—open boats, 201
Davit launched liferaft, 216
Davits, 169, 185, 191, 193
Deadweight, 6
Deadweight cargo, 152
Deadwood, 168
Deck, 4
Deck cranes, 121, 123, 124
Deep tanks, 146
Deep tank cargo, 160
coconut oil, 161, 162
tallow, 161, 162
whale oil, 161, 162
Deep water anchoring, 49
Depth, 3
Derricks, 106
calculations, 127–141
crutch, 108, 109

Derricks (Contd) hallen, 115, 116 heavy lift, 118-121 heel block, 107, 108 operational hand signals, 127, 128 single swinging, 107, 108 stulken, 121 tests and surveys, 125 topping lifts, 107-110 union rig, 110-112 velle, 116, 117 Devils claw, 33, 38 Dewpoint, 159 Dip (flags), 259 Dipping ensign, 259 Displacement, 5 light displacement, 5 load displacement, 5 tonnage, 5 Dolly winch, 107 Double bottom tanks, 17, 145 Double diagonal, 171, 172 Double luff tackle, 102 Double up procedure, 113 Doubler, 34 Dovetail chamber, 31 Dragging anchor, 47, 48 Drain valves, 186 Draught, 3 Draw bolt, 218 Drift, 31, 38 Drills, 242, 243 'D' ring HRU, 218 Drop test, 27 Dry dock stresses, 21 Duck bill fitment, 100 Duct keel, 17 Dunnage, 152 Eccentric wheels, 148

Eccentric wheels, 148
Edible oil, 155
Efficient deck hand, 264
Eight strand plaited, 62
Elbow, 43
Embarkation ladders, 193, 195
Emergency alarm, 240, 241
Emergency communications, 240
Empirical formula, 132
Enclosed lifeboats, 179–185
Engine (lifeboat), 178, 179
Engine room, 14
Ensigns, 257

blue, 258, 259
red, 259
white, 257
EPIRB's, 246, 247
Epoxy coating, 9
Equal lay, 84
Equilibrium, 5, 6
Evacuation systems, 225–227
Exposure cover, 175

Extra flexible steel wire rope, 83 Eye bolt, 91 Eye splice (rope), 76 Eye splice (wire), 93, 94, 95

Fairlead, 35

Feral, 92 Fid, 74 Figure '8' knot, 69, 70 Filler, 171 Fire protected boats, 179-182 First aid outfit, 211 Fishermans bend, 70 Flag maintenance, 257, 258 Flag recognition, 251, 252 Flag signalling, 249-256 Flags: courtesy, house, 258 Flake, 81 Flare, 3 Flat seizing, 73, 74 Flexible steel wire rope, 83 Float free arrangements, 220 Floating block, 190, 197

Floor, 17, 19
Flotation, 5
Flour cargo, 156
Fly, 199, 202
Foot, 201
Fore and aft line, 4
Forestay, 86, 188
Foul anchor, 43
Foul hawse, 43, 50–52
Frame, 17, 19
Freeboard, 3
Free fall lifeboats, 183
Friction allowance, 130
Fruit cargo, 156

Gaff, 6, 259 Gangboard, 168 Ganger length, 33, 54 Garboard strake, 168

General cargo terminology, 152, 153 General cargo vessel, 7, 17, 142, 164 General emergency alarm, 240 'G' flag, 250, 251, 258 G gravity, centre of, 5 Girders, 19 Glass cargo, 156 GMDSS, 245, 246 GM-metacentric height, 6 Gooseneck, 107, 132 Goosewinging, 202, 203 Grain, 154 Grain space, 152 Gravity davits, 191, 192 Grease recess, 99 Gripe, 191 Gripe sheave, 191 Grommet, 175 Gross tonnage, 5, 24 Grow, 43 Guillotine bar, 35 Gun tackle, 101 Gunwale, 168 Gunwale capping, 168 Gunwale chock, 168 Gusset plate, 17 Guy, preventor, 110, 113 Guys-slewing, 107, 111, 112 Gyn, 127 Gyn tackle, 103 Gypsy, 43

Hallen derrick, 115, 116 Halls stockless anchor, 26 Halyard, 65 Hand signals for lifting operations, 128 Handy billy, 101 Hanging off an anchor, 53, 54 Hambroline/houseline, 63 Hard eye, 76, 92 Hard laid rope, 62 Hardwood chock, 108 Hat box, 146 Hatch, 17, 142 board, 142, 143 chain pull, 146 construction, 143 conventional, 142-145 covers, 142-156 slabs, 142 steel/hydraulic, 146-152

tents, 144, 145

Hatchway, 143	Keel, 168, 171	Load stresses, 20, 21, 22
Hawse pipe, 33, 34, 163	grabline, 189	Locking bar, 144
Hawser lay, 60, 62	rake, 4	Locking splice, 93-95
'H' bar, 20	Keelson, 168, 171	Logline, 64
Head, 99	Kenter joining shackle, 30, 31	Longitudinal girders, 17, 20
Head block, 100	King beam, 143	Longitudinals, 17, 18
Heart (of wire), 85	Knee, 17, 168	Long splice, 76, 77
Heaving too, 175		Long stay, 44
Heavy lift, 118-121 .		Loss of anchor, 55-57
Heel block, 107	Langs lay, 84	Loss of windlass power, 52, 53
Heel of mast, 188	Lanyard, 172	Lower hold, 17
Heel tackles, 126	Lashing cables, 50, 51	Lowering hitch, 73
Heliograph, 209	Launching, 191–196	Lowering turns, 73
Hemp rope, 61	lifeboat procedures, 191–193	Lubrication (wires), 85
Hitches, 67–73	stations, 193	Luff, 201, 203
Hogging, 22	rescue boats, 237–240	Luff tackle, 102, 103
Hog piece, 168, 171	Laying out anchors, 49	Lug, 32
Hold, 17	Lay of rope, 59, 62, 80, 84	Lugged joining shackle, 32, 33, 40
ceiling, 17	Lead block, 107, 108, 120	Lugless joining shackle, 30, 31, 40
construction, 17	Leadline, 64	Lumber loadline, 24
preparation, 154	- Lead pellet, 31	
Home, anchor coming, 42	Leech, 201	
Houndsband, 89, 188	Length, 3	Macgregor steel hatches, 146-152
Hove in sight, 43	between perpendiculars, 3	Main halyard, 188
Hydraulic mooring winch, 36	on waterline, 3	Main mast, 6, 188
Trydraune mooring wines, or	overall, 3	Main sail, 6, 201
	Length of lay, 62, 84	Main staysail, 6
Immersion suits, 233-236	Letting go anchors, 34	Main topsail, 6
Inflatable lifejackets, 229–231	Lifeboat (see also boat construction and	Maintenance of
Inflatable liferaft, 204–228	boatwork), 166	blocks, 99
Inflated rescue boat, 237, 238	engine, 178	flags, 256, 257 lifeboats, 184
Inglefield clip, 257	equipment, 174–177	planned, 82, 112
ln irons, 203	falls, 189, 190	Manhelper, 51
Inner bottom longitudinals, 17	question and answer, 266–268	Manilla rope, 59
Insulation material, 159	Lifebuoy specifications, 231–233	Mast truck, 254
Intercostals, 17	Life jacket requirements, 229 Life jacket lights, 230	Marine evacuation system, 225-227
International code of signals, 250, 251	Lifelines, 189	Marking anchor cable, 40
International conference on loadlines, 23	Liferaft, 204–229	Marking of anchors, 29
경기 이번에 그렇게 살을 내고 있다면 없다.	capacity, 208	Marking of sails, 201
	construction, 204, 206, 221	Margin plate, 17, 145
lack, 148	davit launched, 214-218	Marline, 63, 64
law (rope), 59	equipment, 208–211	Marline spike hitch, 69, 70
law (shackle), 32	fittings, 207, 221	Marry two ropes, 78
lib, 6, 124, 201	float free arrangement, 218-221	Martingale, 126
ligger, 102	launching of, 211, 212	Mast, 6, 188
loggled plate, 17	markings, 208, 211, 213	clamp, 188 house, 120
loggle shackle, 44	stowage, 210, 228	main, 6
ubilee clip, 51	Lightening holes, 17, 18	mizzen, 6
umbo derrick, 91, 119 umper stay, 89	Limber boards, 145	rigging, 188
	Liner, 17	step, 188
어린다 그 경영대를 가지 않는 사람들은 장면 가게 되었다.	Load deadweight, 6	chierre 188

Loadlines, 23, 24

thwart, 188

Measurement cargo, 153	Palm and needle whipping, 78	Quick link, 91
Measurement (rope and wire), 86	Palm oil, 162	Quoins, 155
Mechanical advantage, 101, 102	Panting beams, 18	
Messenger, 50	Panting stringers, 18	5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Metacentre, 5	Parceling, 75, 76	Rack and pinion hatches, 150
Metacentric height, 5, 6	Partially enclosed boats, 180, 186	Racking seizing, 74
Metal blocks, 99, 100	Passenger car ferry, 8	Racking stresses, 21
Midshipmans hitch, 70	Passenger ships, 181	Raft release gear, 218-221, 228
Mills atlas release, 217	Pay off, 203	Raised strakes, 17
Mizzen topmast staysail, 6	Peak, 201	Rake of keel, 4
Mooring, 44	Pear link, 111	Ramp, 163
anchors, 57, 58	Perpendiculars, 3	Rations, 210
new rope, 81	Phonetic alphabet, 260	Ratline, 64
shackle, 58	Pillars, 19	Reach, 203
wire, 88, 97	Plain laid, 63	Ream, 44
Morse code, 261	Plaited rope, 62	Recovering anchors, 52, 53
Morse procedure, 260–262	Plan for anchoring, 38, 39	Recovering boats, 197, 198
Moulded dimensions, 3	Plate clamps and dogs, 157, 158	Red ensign, 259
breadth, 3	Plate landings, 17, 18	Reefer cargo, 158–160
depth, 2, 3	Pneumatic windlass, 36	Reefer ship, 12
Mousing hook and shackles, 97, 98	Point line, 64	Reefing sails, 202, 203 Reef knot, 70, 71
Moving block, 101, 190, 197	Polyester, 66	Refrigerants, 159
Multi-fold hatches, 151, 152	Polypropylene, 66	Release gear-boats, 184, 185
Muster lists, 241	Pontoon covers, 150	Render cable, 44
Muster signals, 240, 268	Performing, 85, 86	Rescue boats, 237
	Preparation of anchors, 34, 38, 40 Preventor, 91	equipment, 238, 239
Natural fibre rope, 59	backstay, 91	requirements, 238
Naval pipes, 45	guys, 108, 110, 111	Re-securing anchors, 55–57
Net tonnage, 5	wire, 111	Reserve buoyancy, 6
Non-return valve, 145	Procedure for anchoring, 38, 39	Rib (timber), 168
Numeral flags, 252	Product carrier, 9	Riding cable, 50, 52
Numerals morse, 261	Proof load	Rigging, 82
Nylon rope, 65	anchors, 28	bosuns chair, 71, 73
Nylon strop, 197	cable, 31	derricks, 106-112
	derricks, 125	fid, 74, 75
Oars, 174	Punch and drift, 31	fitments, 91
Offshore supply craft, 13	Purchase (tackle), 100	gyn, 127
Oil bag, 175	advantage, 101, 102	heavy lift derrick, 118-121
Oil fuel tanks, 7, 15, 180	calculations, 130-141	running, 86, 88
Oil separator pump, 15	differential, 105	screw, 89, 90
Oily/water separator, 15	friction allowance, 101, 130	sheer legs, 126
Open boat dangers, 201	gun tackle, 101	stage, 73
Open hatchway, 150	gyn tackle, 103	standing, 86, 87
Opening hatches, 142-152	handy billy, 101	Right ahead, 2
Opening new ropes, 81	jigger, 102	Right astern, 2
Opening new wires, 97	luff (single and double), 102, 103	Right hand laid rope, 62
Open link, 34, 39	three fold, 103	Righting capsized craft, 183
Oxter plate, 18	Pyrotechnics, 174	lifeboats, 189
	경기 : 1 전 1 전 1 전 1 전 1 전 1 전 1 전 1 전 1 전 1	liferaft, 227
Pad eye, 91		Rigid liferafts, 212 access, 212
Painter, 174, 184, 192, 196	'Q' Flag, 250, 251	capacity, 213
Painter shackle, 168	Quarter, 2	construction, 212
Palletisation, 156, 157	Queen beam, 143	

Rigid liferafts (Contd)	Senhouse slip, 92	Snotters, 156
davit launched, 214	Sennet laid rope, 63	Snub, 45
fittings, 213	Serving, 75	Snug, 35, 38
markings, 213	board, 75	Sockets, 90, 91
Rise of floor, 4	mallet, 75	Soft laid rope, 62
Rising, 172	Setting fid, 75	Solid thimble, 92
Rogues yarn, 188	Service of	Span block, 108
Rolling hitch, 70	hydrostatic release, 221	Spare anchor, 55
Roll-on, roll-off, 162, 163	AND THE RESERVE THE PARTY OF TH	Spar ceiling, 150, 152, 154
Roll-on, roll-off ship, 10, 13	liferafts, 228 Shackle	
Rolltite hatches, 152		Special cargoes, 154
Ropework, 59	joining, 30–33	Specifications 221
	length, 44	lifebuoys, 231
rope gauge, 86	mousing, 97, 98	lifejackets, 229
rope lay, 62, 84	parts of, 32	Spider band, 107, 113
Roping twine, 65	Shank, 25	Spile pin, 31
Rose seizing, 74	Shearing stresses, 21	Splay tackles, 126
Round eye, 100	Sheaves, 98, 99	Splices, 76, 93
Round turn and two half hitches, 70, 71	Shell plate, 17	back, 76
Rowlock, 172	Sheepshank, 71	eye, 76, 93–95
Royal standard, 257, 258	Sheer, 3, 44	long, 76, 77
Rubbing strake, 168, 172	Sheer legs, 125, 126	short, 76, 77
Rudder, 187	Sheer strake, 19	Spreader, 158
Runner, 107	Sheet anchor, 45	Spring lay, 84, 85
Running bowline, 67, 68	Sheetbend, 71	Spunyarn, 64
	Ship, 1	Spurling pipe, 33, 35, 45
- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	construction, 17, 20	Stability expressions, 5, 6
Safe handling of derricks, 112, 113	dimensions, 3	Stage rigging, 73
Safety supply/craft, 13	stresses, 20, 21	Standard laid rope, 63
Sagging, 22	terms, 1–7	Standing block, 101
Sail, 6, 201	types, 7–17	Standing rigging, 86, 87
marks on, 201	Shorten cable, 45	Stay
parts of, 201	Short stay, 45	backstay, 91
terms, 6, 203	Shroud, 89, 90	forestay, 86
theory, 201–203	Shroud laid rope, 62	jumper, 89
types, 6, 201	Side bench, 168	topmast, 86, 89
Sailmakers whipping, 77, 78	Side frame, 17	triatic, 89 Staysail, 6
Samson post, 119	Signal halyard, 65 Signal letters, 249	Staysan, 6 Stealer plate, 19
SART, 247, 248	Signals, 250–256	Steam guys, 118
Schooner 6	Single anchor procedure, 39	Steam windlass, 34
	Single letter meanings, 250	Steel hatch covers, 146–156
Scope, 44 Score, 93	Single span derrick, 107	Steel wire rope, 82, 83
Scotsman, 38	Single swinging derrick, 106, 107	Steering flat, 4
Screw eye bolt, 91, 92	Sisal rope, 60	Steering oar, 174
Scuppers, 154	Size of cable, 30	Stem, 168
Sea anchor, 174, 175	Size of rope, 86	Stem band, 168
Seaming twine, 64	Skates, 173	Stem post, 168
Seattle hook, 110	Sleeping cable, 51	Stern, 12
Securing anchors to cable, 33	Slewing guys, 111, 112	Stern door, 10
Securing hatches, 144	Slings, 72	Stern post, 168
Securing Ro Ro cargo, 164	Slip wire, 97	Stock, 4, 25, 26, 58
Seizings, 74	Small gear locker, 173	Stockholm tar, 75
Seizing wire, 40, 85, 98	Small stuff, 63	Stockless anchor, 25, 26

Stoppers, 79, 80 chain, 80, 81 common, 79, 80 West Country, 80 Stowage factor, 153 methods, 155 wires on reels, 96, 97 Strakes, 17 Strand of rope, 59 Stresses on derricks, 129-141 Stretchers, 172 Strops, 157 Strum box, 145 Stud, 31 Stud eye, 100 Stulken derrick, 121 Summer loadline, 22, 23 Surge, 45 Survival craft, 204 Survival manual, 174, 243 Swallow, 98 Swifter, 90 Swivel head, 100 Synthetic fibre rope, 65

Tabernacle, 121 Tack, 201 Tacking, 201 Tackles, 100-103 Tackline, 249 Talurit clamp, 92 Tank cleading, 168 Tank coatings, 9 Tanker, 10, 165 Tanker cargo plans, 164, 165 Tank side bracket, 17, 145 Tank top, 17, 145 ceiling, 145 'T' bulb, 20 Tarpaulins, 142-144 Terms and definitions, 1-7 Tests on anchors, 27

on cable, 29 on derricks, 125 Thermal protective aids, 236 Thimbles, 92, 93 Thole pins, 173 Three fold purchase, 103 Thwart, 168, 172 Thwart knee, 168 Tide rode, 45 Timber dogs, 157, 158 Timber hitch, 70, 71 Timber loadline, 24 Timbers, 168 Tonnage, 5 Topmast stay, 86, 89 Topsail, 6 Topping derricks, 108-110 Topping lift, 108, 109 Totally enclosed boats, 180-204 air support system, 184 capacity, 181 fire protection, 182, 184 launching, 185, 196 release mechanism, 183, 184, 185 requirements, 182, 183 water spray system, 184 Training manual, 243, 244 Transit bearings, 47 Traveler, 188 Triangular plate, 92 Triatic stay, 89 Tricing line, 215 Tricing pendant, 190, 191 Trigger, 191 Tripping line, 175 Tripping palms, 26 Tropical fresh loadline, 22, 24 Tropical loadline, 22, 24 Trunnion, 120 Tumblehome, 3 Tumbler, 108 Turnbuckle, 89 Turn of bilge, 145 Two letter signals, 255, 256 Tyzack bar, 20, 143

'U' bolt, 112
Ullage, 161
Underdeck girders, 143
Union hook, 110
Union plate, 92
Union purchase, 110–113
Unit loads, 162–164
Unstable, 5, 6
Up and down, 45
Upper block, 101
Upper deck, 4, 7
Upper tween deck, 7

Veer cable, 45 Vehicle stowage, 163, 164 VHF use, 48 Velle derrick, 116, 117 Ventilators, 159 Ventilation, 158, 159

Warp threads, 257
Watch at anchor, 46–48
Water lay, 62
Water pressure, 21
Weak link, 218, 219
Wearing, 201, 202
Weft thread, 257
Whippings, 77–79
Winches, 36, 37
Windlass, 33, 35, 36
Wind rode, 45
Winter loadline, 22
Wire work, 82
Wire rope, 83

Yard, 254 'Y' mast, 115 Yo-yo rig, 114

'Z' bar, 20 'Z' cargo block, 99

### INDEX TO PART TWO



Abandonment, 141-143 Abbreviations (IAMSAR), 209 Absolute temperature, 62 Accidents aboard tankers, 261, 263, 267 Accommodation fires, 168, 169 Accommodation ladder, 16, 19 Action of distress vessel, 189, 190 Active fin stabilisers, 225, 226 Adjustment of sextant, 32-34 Admiralty list of lights, 9, 11 list of radio signals, 9, 11 sailing directions, 9, 11 tide tables, 9, 11 weekly notices to mariners, 9, 10 Advance, 219-222 Advice for helmsman and OOW, 219 Aeration-echo sounder, 28 Aground, 110, 131, 145-147 Aircraft carrier, 126 Aircraft in distress, 192 Air cushion vessel, 126, 127 Alternative towing, 246 AMVER, 206-209, 299 Anabatic wind, 57 Anchor ice, 78 Anchor, types, 275, 289 Anchor, use of, 75, 105, 109, 240 Anchoring, in emergency, 240 Anchoring large vessels, 274 Anemometer, 57 Aneroid barometer, 53-56, 57 Annual summary of notices to mariners, 9, 10 Anschutz-gyro compass, 38-40 Anti-cyclone, 57 Arc of sextant, 30 Arming the lead, 26 Athwartships magnets, 41, 43

Atlantic weather areas, 66

Aurora, 57
AUSREP, 208
Automatic pilot, 6
Automatic resuscitation equipment, 266
Auxiliary steering gear, 163
Azimuth mirror, 48-50

Backing, 57 Balanced rudder, 213 Ballast, 254, 259 Baltic moor, 237, 238 Bar, 58 Bare ice, 78 Barograph, 56, 58 Barometer-aneroid, 55 Barometric tendency, 58 BCF (extinguishing agent), 181 (bromochlorodifluoromethane), 181 Beaching, 145-148, 301 Beating out to seaward, 77 Beaufort weather notation, 68, 69 Beaufort wind scale, 67 Behaviour of vessels in heavy weather, 72-75 Bells (ships), 123 Benefit of the lead, 26 Bergy bit, 78 Berthing, 230-231 Binnacle, 41-43 Black oils, 250 Blockage factor, 243 Boiler flue gases, 273 Bollards (bitts), 227, 229 Boundary cooling, 174, 177, 179, 290 Bow/stern thrusters, 223-225 Brash ice, 78 Breast line, 227

Breathing apparatus, 183-185, 266

Breeches buoy, 196, 200, 201, 202 Bridge, 2, 6 Bridge layout, 2 Bridge wing lifebelt, 153, 154 Bridle (gangway), 16 Broach to, 74 Bulk cargo fires, 175 Bulk oil, 175 Bullring, 248 Bulwark ladder, 17 Buoyage IALA system A and B, 132-136, Buoyant smoke float, 199 Buoys-letting go from and securing, 136, 232, 233 Butterworth (tank cleaning) machines, 259, 260

Calling Master, 4, 5 Canal speed, 241, 242 Carbon dioxide CO<sub>2</sub> flooding, 178-181, 187, 188, 251, 289 Cardinal marks, 134 Cargo fires, 185-188 Cargo (oil) handling equipment, 255 Cargo tank ventilation, 263, 264 Carriage of dangerous goods in ships, 14 Casualty rescue, 267 Cavitation, 210, 214 Centering error, 34 Certificates, 292-295 Chafing chain, 248 Chain bridle, 246 Checklist for passage appraisal, 2 Chemical fire extinguisher, 170 Chernikeeff log, 24 Chronometers, 35, 36 Clamp of sextant, 30

Class of fire, 167	Cyclone, 58	Dry dock plan, 152
Clean oils, 250		Dry dock procedures, 150-153
Clearing berth, 230, 231		Dry dock-shore positions, 152
CO <sub>2</sub> gas, 178–181, 187, 188, 251	Damage assessment, 137, 147, 302	Dry powder extinguisher, 167, 1
Coal fire, 186, 187	Damage stability data, 137	Ducting, about propellers, 214
Coastal forecast areas, 65, 70	Dangerous semi-circle, 76, 77	Duties of:
Coastguard services, 204-206	Day signals, 121	helmsman, 6, 7, 8, 211
Coastguard stations UK, 205	Dead beat compass, 44, 289	lookout, 5, 6, 88
Code of safe working practice, 9	Deck checklist following:	officer of watch, 3, 4, 8, 9
Code of safe working practice bulk	beaching, 147	stand-by man, 8, 9
cargoes, 10	grounding, 147	Dust explosions, 176
Cold front, 58	Deck officers duties, 258–261	
Collimation error, 32, 34	tanker loading/discharging, 258, 259	
Collision, 137–141, 298	Deck seal (water), 272	Easy (ice) area, 78
Masters obligations, 137, 138, 298	Deep draughted vessels, 95, 108, 291,	Echo sounding, 26-29
	292	errors, 28
patch, 140	Deep scattering layer, 29	false echoes, 28, 29
Combined jet spray, 178	Deep tank fires, 176	Elastic membrane (compass), 43
Communications	Degrees of freedom (gyro), 36	Elliot White Gill-thrust units, 223
coastguard, 203, 204	Delayed turn, 155	Emergencies, 137
distress, 191, 192	Density, 52, 53	Emergency, 137
helicopters, 159, 299	Department of Trade gangway, 19	anchoring, 240
Compact ice edge, 78 Compact pack ice, 78	Depression, 71	boats crew, 154
	De-rat certificate, 292	bridge lifebuoy, 153, 154
Compass, 37, 43	Deviation, 186	plans and procedures, 252
bowl, 42, 43, 45	Dew, 59	signals, 137, 153
card, 43 correction, 46	Dew point, 59	towing, 247, 248
gyro, 36–40	Diameter (of turning circles), 219, 221,	Enclosed spaces, 266-269
magnetic (dry card), 48	222	Engine distance, 218
magnetic (liquid), 42, 44, 45	Difficult ice area, 78	Engine room department
swing, 300	Diffraction, 59	checks following grounding, 146,
Composite towline, 247	Direction of buoyage, 136	147
Compulsory insurance, 278, 279	Dirty ballast, 254	or beaching, 146, 147
Con, 210	Distress, 191	Englefield clip, 21-23
Concentration of ice, 78	action by distressed vessel, 189-190	Entering docks and locks, 232
Condensation, 58	Masters obligations, 190	Entries into oil record book, 13
Conduction, 58	message, 192	EPIRB's, 193
Consolidated pack ice, 78	receipt of distress, 190, 191, 207, 208,	Errors of marine sextant, 32-34
Constrained by draught, 95, 104, 108	297	Escape sets, 266
Construction of lead line, 25	signals, 114, 123, 197-201	Etesian wind, 59
Construction of synoptic chart, 66	Dock water allowance, 52, 53	Evacuation methods, 157
Contingency plans, heavy weather, 69,	Docking tug, 242, 245	Evaporation, 45, 59
70	Doldrums, 59	Evasive action for bad weather, 77
Controllable factors of ship handling.	Double dunnage, 187; 188	Even keel (turning), 220
212	Double echo, 29	Examination of pilot hoists, 17, 18
Controllable pitch propeller, 215-217	Double turn, 155, 156	Expansion chamber (compass bowl).
Convection, 58	Drag, 210	289
Corona, 58	Dredging down, 238	Explosimeter, 250
Correction of sextant, 32-34, 289	Drift angle, 219, 223	Explosions, 136, 252 Explosive limits, 250, 252
Cotton fires, 186	Drills, 141, 142 Dry card compass, 48	Explosives, 14
Crack in ice, 78	Dry dock-chief officers duty, 150, 151,	Extinguishers, 167, 170
Crash stop, 211	289	Extinguishing agents, 167
Crude oil washing, 259-261	우리는 바다는 이래에는 아이들이 그 나를 하지만 그렇게 먹는 걸어 내려서 다.	[일시] : 2011 [10] : "이 시하다" - "남아를 뭐하는데 모르다니다!

Fairleads, 227, 228 False bottom, 28 False echoes, 28 Fans, 264 Fast ice, 78, 79 Fenders, 150, 232 Final diameter, 219 Fine on the bow, 5, 73 Fin stabilizer control, 226 Fin stabilizers, 225, 226 Fire, 166 Fire and explosion, 250 Fire detection unit, 2 Fire doors, 173 Fire example cargoes, 185-188 coal, 186, 187 cotton, 185, 186 fish meal, 187, 188 LNG, 185 Fire examples, 168-188 accommodation, 168, 169 cargo spaces, 174-177 galley, 169-171 machinery space, 171-173 paint room, 177, 178 small, 166 triangle, 171 Fire fighters, 166 Fire fighting, 166 First adjustment-sextant, 32 First year ice, 79 Fish meal cargo, 187, 188 Fixed fire fighting installations, 178-182, 250 BCF, 181, 182, 251 carbon dioxide CO<sub>2</sub>, 179-182, 251 dry powder, 185, 251 foam, 178, 250, 251 steam smothering, 179, 251 Fishing nets, 291 Fishing vessels, 102, 103 Fishing vessel signals, 103, 120, 121 Fixed blade propeller, 215, 216 Flame proof gauze, 255 Flammable liquids, 14 owl), Flap rudder, 214 Flashpoint, 249 Flaw (ice), 79 Flinders bar, 43, 46 Floating ice, 79 Floating link, 162 Floe (ice), 79

Floeberg, 79

18

Flooding, 139, 140 Foam extinguisher, 170 Foam fixed extinguisher, 251 Fog, 59, 304, 305 Following sea, 74 Forecast areas, 64, 65 Fracture (ice), 79 Frame of sextant, 30, 31 Free gyroscope, 36, 37 Fresh water allowance, 53 Frog, 22, 23 Fronts, 69 Fusee drum, 35

Ganger length, 238 Gangway (DoT), 19 Gangways, 19 Gale, 59, 67 Galley fire, 169, 170 Gas detector, 267 Gas lines, 254 Gas protection suit, 266 Gather way, 212 General declaration, 147 General duty-watchkeeping, 3, 5-9 General (tanker) operations, 249 Gimbals, 35, 36, 45, 46 Girting (girding) a tug, 243, 245 Glacier, 79 Gnomonic projection, 295 Gob rope, 244, 245 Gong, 123 Governor, 21, 22 Graduation error, 34 Grey ice, 79 Grounded ice, 79 Grounding, 145 Growler, 80 Guest warp, 144 Guidelines-marine safety card No. 1, 268-271 Guide line, use of, 267 Gulf stream, 59 Gyro compass, 36-40

> Hail, 59 Halo, 60 Halon, 178, 181-182 Hand flare, 198 Hand lead, 25

> Gyroscopic inertia, 37

Hand smoke, 200 'Hand' the log, 23 Hawser (breeches buoy), 201, 202 Haze, 60 Head lines, 227 Heading how is she, 124 Head on situations, 94 Headreach, 210 Health and safety (aboard tankers), 261-Heat shield, 175, 177 Heaving to, 74, 300 Heavy weather, 69, 71, 72-77 Heeling error magnets, 46 Helicopter procedures, 156-161, 299 Helicopter strop, 159 Helm orders, 8 Helmsman, 6, 7, 210 advice, 6, 7, 219 duties, 6, 7, 8 HM Coastguard, 204, 205 Hoists, 17 Horizon mirror, 32 Horizontal magnets, 46 Horse latitudes, 60 Hose action, 174-178 Hose boxes, 173 Hovercraft, 126, 127 Humidity, 60 Hummock ice, 80 Hurricane, 60, 67, 76, 77 Hydrants, 173 Hydraulic steering, 161, 162 Hydrocarbons, 264-267 Hydrometer, 52-53, 60, 255 Hygrometer, 53, 60

IALA buoyage system, 132-136, 295 IAMSAR, 10, 209 Ice, 60 damage, 84, 85 navigation, 83-85 strengthening, 84, 302 terminology, 78 types, 78-82 Icing up, 67 Ignition point, 252 Ignition sources, 251, 252 IMDG code, 14 IMO, 86 Impellor log, 24, 25 Inclinometer, 43

Inconspicuous partly submerged object, Index arm, 30 Index error, 32-34, 289' Index mirror, 30, 32 Indicator buoys (submarine), 164, 165, 297, 298 Inert gas, 254, 264 Inert gas systems, 269-274 Inhalation of hydrocarbons, 265 Instrument error, 34 Insurance, 278, 279 Insurance certificate, 279 Insurance wire, 247 Interaction, 240-244 International code of signals (INTERCO), 10, 12, 209 (see Part 1, for flag recognition (identity)) International shore connection, 183-185 Intrinsically safe, 252 Iridium pivot, 44, 48 Isobars, 60 Isolated danger buoy, 135 Isotherms, 60

Jack stay, 201
Jayhawk helicopter, 160
Jet/spray, 178
Jumping buoys, 229
Jury rudders, 161
Jury steering, 163

Katabatic wind, 61 Keel, 153 Keel blocks, 151, 152, 153 Kerosene, 250 Key (tail end shaft), 216 KM (dry dock formula), 153

Ladders, 15–20
Land and sea breezes, 61
Landing areas for helicopters, 157
Landing-on helicopter checks, 160, 161
Large tankers, 249
mooring, 274–276
towing arrangements, 247, 248
Lateral marks, 133
Lead (ice), 81

Lead line, 25, 26 Leadsman, 26 Leakage, oil, 277, 278 Letting go from buoys, 233 Level ice, 81 Lifeboat use, 194, 195, 196 Liferaft use, 193, 195 Light and smoke marker, 201 Lightening, 252 Light lists, 9, 11 Lights (navigation), 97, 115-120 Lines of magnetic force, 46 Line throwing apparatus, 144, 194, 202, 203, 289 List, 210, 222 Liquid magnetic compass, 44-46, 289 LNG fires, 185 Loading (tanker) procedure, 276-278 Local direction of buoyage, 136 Location aids, 196-201, 203, 204 Log, 21 impeller type, 24, 25 rotator type, 21-24 Logline, 23, 24 Long distance towing, 244 Lookout, 9, 88 duty, 5, 6 field of view, 5, 291 Loss of rudder, 161-163 Lubber line, 47, 51

Machinery space fires, 171-173 Magnetic compass, 41-51 Making way, 212 Manifold, 254 Manropes, 15 Manoeuvring signals, 111 Man overboard, 153-156, 294 Marine instruments, 30 Marine safety card No. 1, 270, 271 Marine sextant, 30-34 Mariners handbook, 11 Maritime rescue co-ordination centres UK. 70 Marks on lead line, 25 Masons hygrometer, 53 Masters' obligations in distress, 138, 190 Masters responsibilities, 1 Mechanical hoists, 17, 18 Merchant shipping notices, 10 Meteorological terms, 57-65 Meteorology, 57-86

Micrometer sextant, 30, 31 Mine clearance vessels, 108 Minerva fire detection unit, 2 Mirage, 61 Monsoon, 61 Mooring, 233 Baltic moor, 237 Mediterranean moor, 238, 239 open moor, 236 running moor, 233, 234, 235 standing moor, 235-236 Mooring lines, 227 Mooring swivel, 236 Mooring systems, 227, 275, 276 Motive power, 220 Multi angled fairlead, 227 Multi-year ice, 81

Narrow channels, 90, 241 Nautical almanac, 12 Nautical tables, 12 Navigable semi-circle, 76 Navigational warning, 191 Navigational watchkeeping, 1-9 New dangers, 295 New ice, 81 Nilas, 81 Nip, 82 Non-adjustable errors of sextant, 34 Non-displacement craft, 128 Non-persistent oil, 278 Non-return valve, 272 North Atlantic weather forecast areas, 66 Notices to mariners, 9, 10 Not under command, 103, 105 Nozzles jet/spray type, 178

Obligations of rescue craft, 190
Officer (watchkeeping) duties, 3-6
Official publications, 9-14
Offshore anchor, 275, 289
Offshore installation, 127
Oil, 278
fires, 249
pollution, 276, 278-284
pollution manual, 10
pollution participating countries, 287
to the convention
record book, 12, 13
references, 285, 286
residues, 279

rigs/platforms, 127, 128 Pressure vacuum breaker, 269 Part D-Sound and light signals, 111tankers, 249, 250 Preventing collision at sea, 86 Oil water separator, 279 Principle of echo sounder, 26-28 Part E-Exemptions and annexes, 114, Old man/deadman, 227 Principle of sextant, 31 115 On scene co-ordinator OSC, 204, 207-Prismatic error, 34 restricted visibility 209 Production platforms, 127, 128 (Section I), 88 Open moor, 236 Prohibition of oil discharge, 282, 283 (Section II), 93 Open pack ice, 82 **Propellers** (Section III), 95 Open water, 82 controllable pitch, 212, 216 Remote controlled craft, 129 Operating in ice conditions, 83, 84 fixed pitch, 212, 215, 216, 240 Rescue and recovery, 143-145 Overtaking, 93 propeller removal, 150 Rescue of casualties, 172, 266, 267 Oxygen analyzer, 265 propeller slip, 217, 218 Restricted in ability to manoeuvre, 103, Oxygen-in fire, 171 Protective equipment, 266 106-107 Pump room precautions, 266-271 Ridge, 62 Pack ice, 82, 85 Pump room rescue, 267 Riding cable, 235, 236 Paint room fire, 177, 178 Purge pipe, 264 Rigging pilot ladders, 15-20 Pair trawling, 121 Purse seiners, 120, 121 Rigging slip wires, 228, 229 Panama lead, 228, 248 Pyrotechnics, 196-201 Rigidity in space, 37 Pancake ice, 82 Pythagorean error, 28 Rocket line throwing gear, 202, 203 Passage appraisal, 2 Rocket parachute flare, 197 Passenger vessel emergency, 142, 143 Roller fairlead, 227, 228 Patent rotator log, 21 Quadrantal correctors, 43, 45, 46 Roll-on, roll-off vessel emergency, 143, Pelorus, 50, 51 Quadrant steering, 163 Period of encounter, 71, 72 Quartermaster, 6, 211. Rotary vane steering, 162 Performance monitor (radar), 290 Quayside mooring, 227 Rotator log, 21-23 Period of roll, 71, 72 Questions and answers, 289-307 Rotten ice, 82 Permanent ballast, 254 Rudders, 213 Persistent oil, 278 angle, 222 Phosphorescence, 61 Radar reflectors, 4, 136 carrier, 163 Pilot books, 11 Radiation, 61 loss, 161–163 Pilot hoists, 17-20 Radio signals, 9, 11 stock, 163 Pilot ladders, 15-20 Rafted ice, 82 Rudder types, 213 Pilot vessels, 104, 105, 131 Rain, 61 balanced, 213 Pilot wheels, 7 Rainbow, 62 flap, 214 Ranging (on moorings), 241 Pipelines, 254, 262, 263 plate, 213 Reaction fin, 214 Pitch (of propellers), 211, 219 rotor, 214 Reception of slops, 279 Pitching, 72 schilling, 214, 215 Recurvature of storm, 62 Pivot (compass) point, 44 semi-balanced, 213 Reduction of speed, 90, 168. Pivot point, 211 spade, 213 Refined product carrier, 250 Plug plan, 152 un-balanced, 213 Reflector (compass) unit, 47 Plugs, 151 Rule of the road: questions and answers, Refraction, 62 Polar front, 61 129-132 Regulations, for the prevention of, 86 Pollution, 276, 277 Annex I, 115 incidents, 279 precautions against, 276-281 Annex, II, 120 Safe entry, 266-271 Annex, III, 121 references, 285, 286 Safe handling towlines, 243 regulations resume, 283 Annex, IV, 123 Safe port options, 140 Pooping, 73 Collision at sea, 88-88 Safe speed, 88, 89 Pounding, 73 conduct of vessels in, 95 Safe water mark, 135 Precession, 37 Part A-General, 86-88 Safety checklist-helicopters, 156, 157, Precipitation, 61, 71 Part B-Steering and sailing rules, 88-Precision aneroid barometer, 53-56 Safety construction certificate, 292, 293 Preferred channel marks, 133, 134 Part C-Lights and shapes, 96-111 Safety equipment certificate, 292, 293

	Safety officer/safety committee, 306,	Specialized carriers, 250	Tanker, 142
	307	Special cases to Rule of the Road, 125-	hazard, 142
	Safety radio certificate, 292, 293	127 - 127 -	safety guide, 253
	Sailing directions, 9, 11	Special marks, 135	vessel, 249
	Sailing vessels, 93, 102	Special operations Ro Ro vessel, 195	work, 249–286
	SART's, 191, 192, 209	Specific gravity, 255	Technical detail: lights and shapes, 115-
	Schilling rudders, 214	Sphere correctors, 43, 45, 46	120
	Scrambling nets, 143	Spontaneous combustion, 177, 186, 187,	Telemotor transmission, 162
	Screens (sidelights), 117	252	Telescopic compass reflector unit, 47
	Scrubbing tower, 273	Squall, 62	Tender ship, 71
	Sea anchors, 75, 76	Squat, 211	Temperature, 62
	Sea ice, 82.	Stabilizer fins, 226	can, 256
	Seaplane, 111, 128	Stanchions, 15	Testing mechanical hoists, 18
	Search and rescue operations, 191	Standing moor, 235, 236	Test meter (oxygen), 265
	Search patterns, 191	Steam smothering, 179	Third adjustment sextant, 32-34
	Sea-sickness medicine, 174, 210	Steel tape measure, 255	Thrust units, 223-225
	Securing propeller, 216	Steering gear, 161–163	Thunder, 62
	Securing to buoys, 228, 229, 232, 233	failure, 163	Tidal stream atlas, 9, 12
	Separation schemes, 92	types, 163	Tide tables, 9, 11
	Semi-balanced rudder, 214	Stern light, 97, 98	Tiller, 162
	Set, 211	Stern lines, 227	Tipsy key, 35
	Sextant, 30-34	Stern thruster, 223, 224	Tornado, 63
	Shade error, 34	Stern to sea, 73, 74	Torque, 35
	Shadow pin, 50	Stevenson's screen, 53	Towing, 195, 243–248
	Shallow water effect, 241, 242	Stiff ships, 71, 73	Towing and pushing, 99-102
	Sheer, 211	Stopping distance, 211	Trade winds, 63
	Ship handling	Storm movement, 77	Traffic separation schemes, 92
	factors, 212	Stowage factor, 291	Training and drills, 141
	in ice conditions, 83, 84	Stranded ice, 82	Transfer, 219, 221
	Ship/shore connection, 183	Stranding, 145	Transfer of oil, 279, 281
	Ship to shore (tanker) checklist, 253	Stratosphere, 62	Transmission line error, 28
	Shoring up bulkheads, 140	Stuffing box, 163	Tropical revolving storms, 76, 77
	Short round, 234	Sub-sunk buoys, 165	Tropopause, 76
	Shoulder post, 246	Sub-sunk procedure, 164, 165	Trough, 63
	Side keel blocks, 152	Surface rescues, 193-196	Tugs, 242–248
	Sidelights, 99, 116, 117	Surrounding a fire, 169	Turning circles, 219–223
	Sighting port spanner, 253, 256	Survivors, 143-145	Turning short round, 234
	Single point mooring, 275, 276	Swell, 68	Tween deck fires, 174
	Skin contact by hydrocarbons, 264, 265	Synchronism, 72	Twilight, 63
	Slack tanks, 276, 277	Synoptic weather chart, 71	Twin screw propulsion, 216, 217
	Sleeping cable, 235, 236		Types of rudder, 213
	Sleet, 62		Types of fudder, 215
	Slip of propeller, 217, 218	Tabular berg, 82	
	Slip wires/ropes, 228, 229	Tackling a fire, 169	Lillago 256
	Slops, 279	Tactical diameter, 219	Ullage, 256
	사용하는 경기 등에 들어 보는 사람들이 되었다. 그렇게 하는 사람들은 사람들이 되었다면 하는 사람들이 되었다. 그렇게 되었다.	Taking the ground, 145–147	pipe plan, 262
	Small fires, 166	Tank, 256	stick, 256
	Smoke signals, 199–201	cleaning, 260, 261	Unbalanced plate rudder, 213
	Snow, 62 Snubbing round 220	gauge, 257, 258	Underway, 212
1	Snubbing round, 239	layout, 262, 263	Union purchase, 294
	Sounding, 256		United Kingdom buoyage direction, 136
	Sounding rod, 255	lid, 262	UK buoys, 136
	Sound signals, 121	lid plan, 262	UK coastal forecast, 64
	Spade rudder, 213	measurement, 256	Universal multi-angled fairlead, 228
			연극되었다. 아이를 하는 아니라 마음이 하셨다는데 생겨하는

Urgency signal, 191 Use of anchors, 75 Use of sea anchors, 75 Use of storm oil, 74, 75 Use of tugs, 242

Veering, 63
Ventilation, 264
Vent valves, 263, 264
Vertex, 63
Very close pack ice, 82
Very large crude carrier, 249
Vessel, 87

Vessel in distress, 189 Virtual loss of GM, 152, 153 Visibility, 63 Visibility of lights, 97 Volatile liquid, 249

Warships, 125–126 Warm front, 63, 68 Watchkeeping duties, 3–9 Watertight doors, 148, 149 Watertight integrity, 147 Water wall system, 251 Washing cycles, 261 Wave scale, 67, 68
Way, 212
Weather chart, 64–66, 71
Weather report codes, 67, 68
Weather side, 212
Weekly notices to mariners, 9, 10
Wheel key, 254, 257
Whessoe tank gauge, 257, 258
Whistles, 121, 122
Wine carrier, 250
Winnets, 17

Yaw, 212