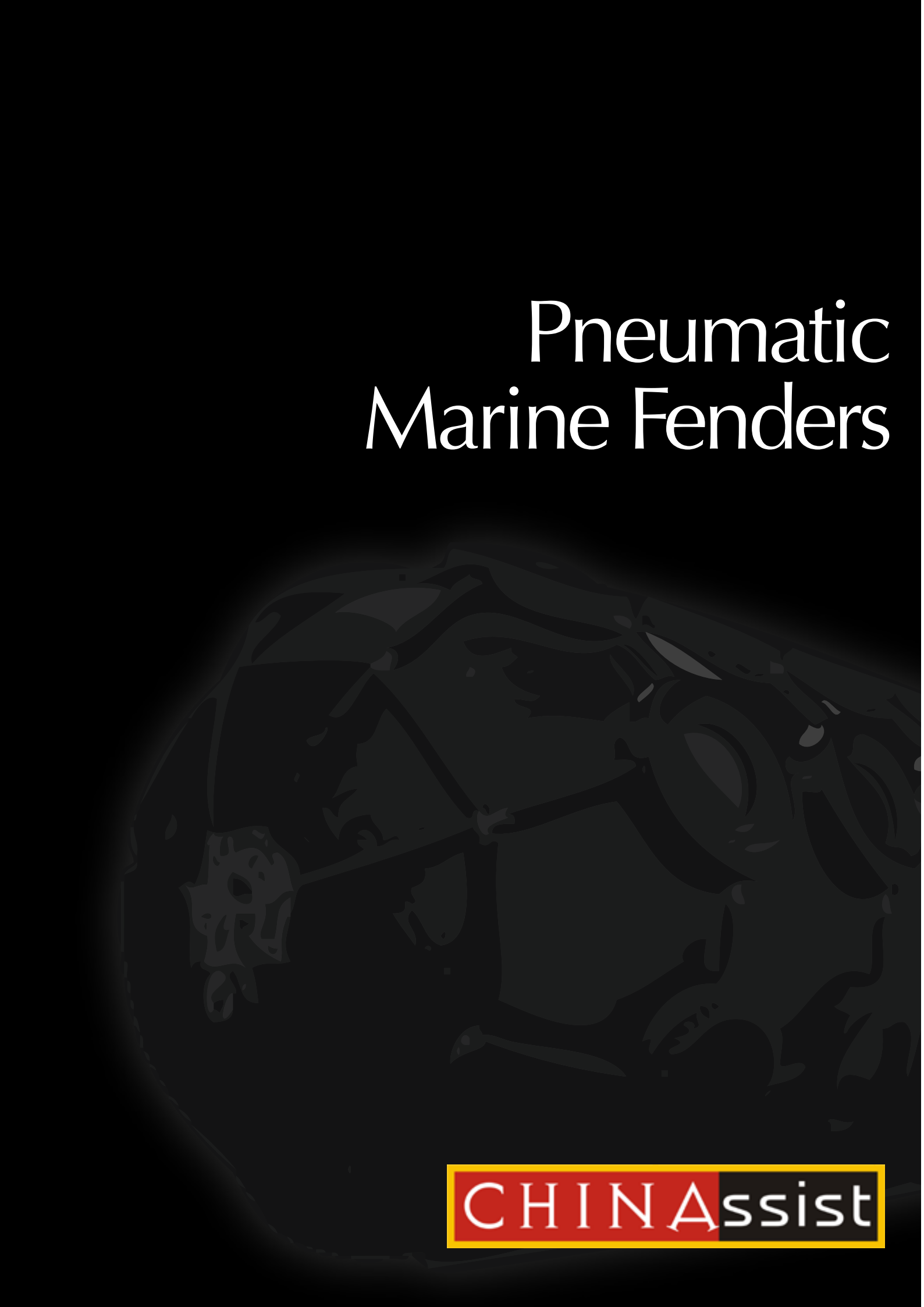
Pneumatic Marine Fenders



CHINAssist

Pneumatic Marine Fenders

CHINAssist offer a wide selection of heavy duty pneumatic marine fenders for use during ship-to-ship contact (STS) and ship-to-berthing (STB). Our pneumatic fenders provide massive energy absorption with low unit surface pressure acted upon the ship. This design of fender is used extensively by large tankers, LPG vessels, ocean platforms, large docks, harbours and wharfs.

CHINAssist pneumatic fenders provide superb protection, outstanding performance, durability and safety, at an extremely competitive cost.

Designed to last
The highly durable chain net design provides external protection to the fender body, whilst the high quality materials and components used in the construction of the fender gives market leading longevity. Zinc-coated metal components protect against corrosion, whilst the overall simplicity of its design allows for cost effective maintenance and refurbishment.

Technical Data
Please see our technical data tables on the following pages to determine the required performance for your fenders and then contact us using the details below for lead time and pricing information.

Who we are
CHINAssist is a British Company with extensive experience in supplying the 'offshore', and shipping industries with sourcing and project support services.

For full details of the **CHINAssist** range of pneumatic marine fenders, or to learn about our extensive marine sourcing services, please contact us via the details below.

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Data Tables

Table 1 – The size of installation parts

Fender Size Dia x Length (m)	Guy Wire Diameter (mm)	Guy chain or fibre rope Diameter (mm)	Sheckle Diameter (mm)	Swivel joint Diameter (mm)	Anchor Diameter (mm)
0.5 x 1.0	12	14	14	18	18
0.6 x 1.0	12	14	14	18	20
0.7 x 1.5	14	16	18	18	25
1.0 x1.5	14	16	18	18	25
1.0 x 2.0	14	16	18	18	25
1.2 x 2.0	16	16	18	22	28
1.35 x 3.0	16	18	18	22	28
1.5 x 3.0	18	18	22	24	28
1.7 x 3.0	20	20	24	24	30
2.0 x 3.5	24	24	28	28	34
2.5 x 4.0	24	26	28	32	34
2.5 x 5.5	24	26	28	34	34
3.3 x 4.5	26	28	30	38	40
3.3 x 6.5	28	30	32	44	60

Please note that all information provided in the table above and on any preceeding and following pages is intended for use as a guide only, and CHINAssit make no guarantee or warranty regarding accuracy or suitability for use. Please ensure that all data and specifications you provide are checked by a suitably qualified person before any order is placed.

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Data Tables

Table 2 – Specifications and technical performance

Nominal Size D X L (m)	Initial internal pressure P = 0.05MPs			Initial internal pressure P =0.08 MPa		
	Weight (kg)	R (kn)	E (kJ)	Weight (kg)	R (kN)	E (kJ)
0.5 x 1.0	25	64	6	25	83	8
0.6 x 1.0	32	74	8	32	96	11
0.7 x 1.5	50	137	17	50	178	24
1.0 x 1.5	80	182	32	80	235	44
1.0 x 2.0	100	257	45	125	335	63
1.2 x 2.0	120	297	63	165	386	86
1.35 x 2.5	165	427	102	226	554	140
1.5 x 3.0	315	597	153	370	751	211
1.7 x 3.0	405	639	191	436	830	263
2.0 x 3.5	590	875	308	632	1138	424
2.5 x 4.0	1050	1381	663	1110	1815	925
2.5 x 3.5	1333	2019	943	1410	2653	1317
3.0 x 5.0	1880	2104	1210	2155	2700	1571
3.0 x 6.0	2160	2583	1485	2470	3292	1888
3.3 x 4.5	2020	1884	1175	2300	2476	1640
3.3 x 6.0	2300	2783	1675	2600	3652	2338
3.3 x 6.5	2700	3015	1814	3080	3961	2532

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Data Tables

Table 3 – Energy Absorption of oil tankers at 1/4 point berthing (kJ)

DWT	Assumed Weight (1)	Approaching velocity (m/s)							
		0.10	0.12	0.15	0.18	0.20	0.25	0.30	0.40
300	668	1.7	2.5	3.8	5.5	6.8	11.0	15.0	27.0
500	1,091	2.8	4.0	6.3	9.0	11.0	17.0	25.0	45.0
700	1,558	2.0	5.7	8.9	13.0	16.0	25.0	36.0	64.0
1,000	2,228	5.7	8.2	14.0	18.0	23.0	36.0	51.0	91.0
2,000	4,294	11.0	16.0	28.0	35.0	44.0	68.0	99.0	175
3,000	6,470	17.0	24.0	37.0	53.0	66.0	103	149	264
4,000	8,363	21.0	31.0	54.0	69.0	85.0	133	192	341
5,000	10,594	27.0	39.0	61.0	88.0	108	169	243	432
6,000	12,184	31.0	45.0	70.0	101	124	194	280	497
7,000	14,084	36.0	52.0	81.0	116	144	225	323	575
8,000	16,066	41.0	59.0	92.0	133	164	256	369	656
10,000	20,373	52.0	75.0	117	168	208	325	468	832
12,000	23,851	61.0	88.0	137	197	243	380	548	974
15,000	29,493	75.0	108	169	244	301	470	677	1200
17,000	33,056	84.0	121	190	273	337	527	759	1350
20,000	38,623	99.0	142	222	319	394	616	887	1580
25,000	45,946	117.0	169	264	380	469	733	1050	1880
30,000	56,093	143.0	206	322	464	572	894	1290	2290
35,000	63.084	161.0	232	362	521	644	1010	1450	2570
40,000	72,771	186.0	267	418	601	743	1160	1670	2970
45,000	77,986	199.0	286	448	645	796	1240	1790	3180
50,000	89,818	229.0	330	516	742	917	1430	2060	3670
60,000	104,300	266.0	383	599	862	1060	1660	2390	4260
65,000	114,637	292.0	421	658	948	1170	1830	2630	4680
70,000	122,108	312	449	701	1010	1250	1950	2800	4980
80,000	136,972	349.0	503	786	1130	1400	2180	3140	5590
85,000	143,359	366.0	527	823	1180	1460	2290	3290	5850
100,000	166,004	423.0	610	953	1370	1690	2650	3810	6780
120,000	200,083	510.0	735	1150	1650	2040	3190	4590	8170
150,000	251,895	643.0	925	1450	2080	2570	4020	5780	10280
200,000	327,735	836.0	1200	1880	2710	3340	5230	7520	13380
250,000	401,268	1020	1470	2300	3320	4090	6400	9210	16380
330,000	548,670	1400	2020	3150	4530	5600	8750	12600	22390
480,000	795,540	2030	2920	4570	6580	8120	12680	18260	32470

Data Tables

Table 4 – Energy absorption of ore carriers at ¼ point berthing (kj)

DWT	Assumed Weight (t)	Approaching Velocity (m/s)							
		0.10	0.12	0.15	0.18	0.20	0.25	0.30	0.40
1,000	2,360	6.0	8.7	14.0	20.0	24.0	38.0	54.0	96.0
2,000	4,429	11.0	16.0	25.0	37.0	45.0	71.0	102	181
3,000	6,435	16.0	24.0	37.0	53.0	66.0	103	148	263
4,000	8,341	21.0	31.0	48.0	69.0	85.0	133	192	340
5,000	10,301	26.0	38.0	59.0	85.0	105	164	237	420
6,000	12,574	32.0	45.0	72.0	104	128	200	289	513
8,000	16,332	42..0	60.0	94.0	135	167	260	375	667
10,000	20,516	52.0	75.0	118	170	209	327	471	837
12,000	24,345	62.0	89.0	140	201	248	388	559	994
15,000	29,572	75.0	109	170	244	302	471	679	1210
20.000	38,068	97.0	140	219	315	388	607	874	1550
25,000	45,116	115	166	259	373	460	719	1040	1840
30,000	54,874	140	202	315	454	560	875	1260	2240
40,000	71,143	181	261	408	588	726	1130	1980	3530
50,000	86,432	220	318	496	714	882	1380	1980	3530
60,000	101,383	259	372	582	838	1030	1620	2330	4140
70,000	119,062	304	437	683	984	1210	1900	2730	4860
80,000	132,125	337	483	758	1090	1350	2110	3030	5390
90,000	149,528	381	549	858	1240	1530	2380	3430	6100
100,000	175,960	449	646	1010	1450	1800	2810	4040	7180
150,000	256,357	654	942	1470	2120	2620	4090	5890	10460
200,000	319,149	814	1170	1830	2640	3260	5090	7330	13030
270,000	426,459	1090	1570	2450	3520	4350	6800	9790	17410

Data Tables

Table 5 – Energy absorption of freighters at ¼ point berthing (kj)

DWT	Assumed Weight (t)	Approaching velocity (m/s)							
		0.10	0.12	0.15	0.18	0.20	0.25	0.30	0.40
700	1,585	4.0	5.8	9.1	13.0	16.0	25.0	36.0	65.0
1,000	2,237	5.7	8.2	13.0	18.0	23.0	36.0	51.0	91.0
2,000	4,357	11.0	16.0	25.0	36.0	44.0	69.0	100	178
3,000	6,606	17.0	24.0	38.0	55.0	67.0	105	152	270
4,000	8,712	22.0	32.0	50.0	72.0	89.0	139	200	356
5,000	10,795	28.0	40.0	62.0	89.0	110	172	248	441
6,000	13,515	34.0	50.0	78.0	112	138	215	310	552
7,000	15,557	40.0	55.0	89.0	129	159	248	357	645
8,000	17,703	45.0	65.0	102	146	181	282	406	723
9,000	19,625	50.0	72.0	113	162	200	313	451	801
10,000	21,630	55.0	79.0	124	179	221	345	497	883
12,000	26.052	66.0	96.0	150	215	266	415	598	1060
15,000	31,477	80.0	116	181	260	321	502	723	1280
17,000	36,784	94.0	135	211	304	375	586	845	1500
20,000	41,748	107	153	240	345	426	666	959	1700
30,000	60,483	154	222	347	500	617	964	1390	2470
40,000	79,393	203	292	456	656	810	1270	1820	3240
50,000	98,306	251	351	564	813	1000	1570	2260	4010

Data Tables

Table 6 – Energy Absorption of passenger ships at ¼ point berthing (kj)

DWT	Assumed Weight (t)	Approaching velocity (m/s)							
		0.10	0.12	0.15	0.18	0.20	0.25	0.30	0.40
500	845	2.2	3.1	4.9	7.0	8.6	13.0	19.0	34.0
1,000	1,709	4.3	6.2	9.8	14.0	17.0	27.0	39.0	70.0
2,000	3,500	8.9	13.0	20.0	29.0	36.0	56.0	80.0	143
3,000	5,282	13.0	19.0	30.0	44.0	54.0	84.0	121	216
4,000	7,105	18.0	26.0	41.0	59.0	73.0	113	163	290
5,000	8,912	23.0	33.0	51.0	74.0	91.0	142	205	364
6,000	12,083	31.0	44.0	69.0	100	123	193	277	493
7,000	13,873	35.0	51.0	80.0	115	142	221	319	566
8,000	15,346	39.0	56.0	88.0	127	157	245	352	626
9,000	16,986	43.0	62.0	97.0	140	173	271	390	693
10,000	18,661	48.0	69.0	107	154	190	298	428	762
15,000	26,283	67.0	97.0	151	217	268	419	603	1070
20,000	33,423	85.0	123	192	276	341	533	767	1360
30,000	47,952	122	176	275	396	489	765	1100	1960
50,000	71,744	183	264	412	593	732	1140	1650	2930
80,000	111,956	286	411	643	925	1140	1790	2570	4570

Data Tables

Table 7 Energy absorption of barges or lighters at ¼ point berthing (kj)

G/T	Assumed Weight (t)	Approaching velocity (m/s)						
		0.20	0.25	0.30	0.35	0.40	0.50	0.60
50	85	0.9	1.4	2.0	2.7	3.5	5.4	7.8
100	161	1.6	2.6	3.7	5.0	6.6	11.0	15.0
150	241	2.5	3.8	5.5	7.5	9.8	15.0	22.0
200	319	3.3	5.1	7.3	10.0	13.0	20.0	29.0
300	496	5.1	7.9	11.0	15.0	20.0	32.0	46.0

Table 8 Energy absorption of container ships at ¼ point berthing (kj)

G/T	DWT	Assumed Weight (t)	Approaching velocity (m/s)					
			0.10	0.15	0.20	0.25	0.30	0.40
8,000	12,000	26,752	68	154	273	427	614	1090
9,000	14,000	33,567	86	193	343	535	771	1370
16,626	16,004	38,172	97	219	390	609	876	1560
21,037	20,400	48,995	125	281	500	781	1120	2000
23,600	23,650	55,560	142	319	567	886	1280	2270
30,922	27,203	64,264	164	369	656	1020	1480	2620
38,826	33,287	79,599	203	457	812	1270	1830	3250
41,127	27,752	67,121	171	385	685	1070	1540	2740
51,500	28,900	68,664	175	394	701	1090	1580	2800
57,000	49,700	105,199	268	604	1070	1680	2420	4290

Data Tables

Table 9 Energy Absorption of fishing vessels at ¼ point berthing (kj)

Type	G/T	Assumed Weight	Approaching velocity (m/s)						
			0.20	0.25	0.30	0.35	0.40	0.50	0.60
Whale factory ship	10,000	34,058	348	543	782	1060	1390	2170	3130
	17,000	53,494	546	653	1230	1670	2180	3410	4910
	20,000	66,217	676	1060	1520	2070	2700	4220	6080
Whale ship	400	1,797	18.0	29.0	41.0	56.0	73.0	115	165
	800	3,263	33.0	52.0	75.0	102	133	208	300
	1,000	3,950	40.0	63.0	91.0	123	161	252	363
Trawler vessel	400	2,297	23.0	37.0	53.0	72.0	94.0	146	211
	800	3,693	38.0	59.0	85.0	115	151	236	339
	1,000	4,458	45.0	71.0	102	139	182	284	409
	2,000	7,713	73.0	114	165	224	293	457	659
	3,000	9,863	101	157	226	308	403	629	906
Shipjack vessel	20	126	1.3	2.0	2.9	3.9	5.1	8.0	12.0
	50	202	2.1	3.2	4.6	6.3	8.2	12.9	19.0
	100	390	4.0	6.2	9.0	12.0	16.0	25.0	36.0
	200	779	7.9	12.0	18.0	24.0	32.0	50.0	72.0
Mackerel vessel	20	112	1.1	1.8	2.6	3.5	4.6	7.1	10.0
	50	266	2.7	4.2	6.1	8.3	11.0	17.0	24.0
	100	525	5.4	8.4	12.0	16.0	21.0	33.0	48.0
Tuna long liner	150	590	6.0	9.4	14.0	18.0	24.0	38.0	54.0
	200	780	8.0	12.0	18.0	24.0	32.0	50.0	72.0
	400	1,681	17.0	27.0	39.0	53.0	69.0	107	154
Round haul netter	20	75	0.8	1.1	1.7	2.3	3.1	4.8	6.9
	50	191	1.9	3.0	4.4	6.0	7.8	12.0	18.0
	100	377	3.8	6.0	8.7	12.0	15.0	24.0	35.0
Towing net vessel	20	99	1.0	1.6	2.3	3.1	4.0	6.3	9.1
	50	204	2.1	3.3	4.7	6.4	8.3	13.0	19.0
	100	361	3.7	5.8	8.3	11.0	15.0	23.0	33.0
	300	1,138	12.0	18.0	26.0	36.0	46.0	73.0	105
	500	1,838	19.0	29.0	42.0	57.0	75.0	117	169
General fishing vessel	20	77	0.8	1.2	1.8	2.4	3.1	4.9	7.1
	50	195	2.0	3.1	4.5	6.1	8.0	12.0	18.0
	100	350	3.6	5.6	8.0	11.0	14.0	22.0	32.0
	150	500	5.1	8.0	11.0	16.0	20.0	32.0	46.0

Data Tables

Table 10 Energy absorption of ferry boats at ¼ point berthing (kj)

G/T	Assumed weight (t)	Approaching velocity (m/s)						
		0.20	0.25	0.30	0.35	0.40	0.50	0.60
50	124	1.3	2.0	2.8	3.8	5.1	7.9	11.0
100	246	2.5	3.9	5.6	7.7	10.0	16.0	23.0
200	430	4.4	6.9	9.9	13.0	18.0	27.0	39.0
300	664	6.8	11.0	15.0	21.0	27.0	42.0	61.0
500	1,012	10.0	16.0	23.0	32.0	41.0	65.0	93.0
1000	1,796	18.0	29.0	41.0	56.0	73.0	115	165

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Data Tables

Table 11 kinetic energy (kj) at ship to ship berthing

	Ship A	1,000 DWT			2,000 DWT			3,000 DWT		
Ship B	Assumed W	2,228 t			4,294 t			6,470 t		
DWT	Assumed W	0.3m/s	0.4m/s	0.5m/s	0.3m/s	0.4m/s	0.5m/s	0.3m/s	0.4m/s	0.5m/s
1,000	2,2281	26	45	71						
2,000	4,2941	34	60	94	49	88	77			
3,000	6,4701	38	68	106	59	105	165	74	132	206
4,000	8,3631	40	72	112	65	116	181	84	149	233
5,000	10,594t	42	75	117	70	125	195	92	164	256
6,000	12,184t	43	77	120	73	130	202	97	172	269
7,000	14,084t	44	78	123	76	134	210	102	181	283
8,000	16,066t	45	80	125	78	138	216	106	188	294
10,000	20,373t	46	82	128	81	145	226	113	200	313
12,000	23,851t	47	83	130	84	148	232	117	208	324
15,000	29,493t	48	85	132	86	153	239	122	216	338
17,000	33,056t	48	85	133	87	155	242	124	221	345
20,000	38,623t	48	86	134	89	158	246	127	226	353
25,000	45,946t	49	87	135	90	160	250	130	231	362
30,000	56,093t	49	87	137	92	163	254	133	237	370
35,000	63,084t	49	88	137	92	164	256	135	239	374
40,000	72,771t	50	88	138	93	165	258	136	242	379
45,000	77,986t	50	88	138	93	166	259	137	244	381
50,000	89,818	50	89	139	94	167	261	139	246	385
60,000	104,300t	50	89	139	95	168	263	140	249	388
65,000	114,637t	50	89	139	95	169	264	141	250	390
70,000	122,108t	50	89	139	95	169	264	141	251	392
80,000	136,972t	50	89	140	96	170	265	142	252	394
85,000	143,359t	50	90	140	96	170	266	142	253	395
100,000	166,004t	50	90	140	96	171	267	143	254	397
120,000	200,083t	51	90	140	96	172	268	144	256	400
150,000	251,896	51	90	141	97	172	269	145	257	402
200,000	327,735t	51	90	141	97	173	270	146	259	404
250,000	401,268t	51	90	141	98	173	271	146	260	406
330,000	548,670t	51	91	141	98	174	272	147	261	408
370,000	627,016t	51	91	142	98	174	272	147	261	408
480,000	795,540t	51	91	142	98	174	272	147	262	409

Data Tables

Continued - Table 11 Kinetic energy (kj) at ship berthing

	Ship A	4,000 DWT			5,000 DWT			6,000 DWT		
Ship B	Assumed W	8,363t			10,594t			12,184t		
DWT	Assumed W	0.3m/s	0.4m/s	0.5m/s	0.3m/s	0.4m/s	0.5m/s	0.3m/s	0.4m/s	0.5m/s
1,000	2,228t									
2,000	4,294t									
3,000	6,470t									
4,000	8,363t	96	171	267						
5,000	10,594t	107	191	298	122	216	338			
6,000	12,184t	114	202	316	130	231	361	140	249	388
7,000	14,084t	120	214	335	139	247	385	150	267	416
8,000	16,066t	126	224	351	147	260	407	159	283	442
10,000	20,373t	136	242	378	160	284	444	175	311	486
12,000	23,851t	142	253	395	168	299	468	185	329	514
15,000	29,493t	150	266	415	179	318	497	198	352	550
17,000	33,056t	153	272	425	184	327	511	204	363	568
20,000	38,623t	158	280	438	191	339	530	213	378	590
25,000	45,946t	162	289	451	198	351	549	221	393	614
30,000	56,093t	167	297	464	205	364	568	230	408	638
35,000	63,084t	169	301	471	208	370	578	234	417	653
40,000	72,771t	172	306	478	212	377	590	240	426	665
45,000	77,986t	173	308	482	214	381	595	242	430	672
50,000	89,818t	176	312	488	217	387	604	246	438	684
60,000	104,300t	178	316	494	221	392	613	250	445	695
65,000	114,637t	179	318	497	223	396	618	253	449	702
70,000	122,108t	180	319	499	224	398	621	254	452	706
80,000	136,972t	181	322	502	226	401	627	257	457	713
85,000	143,359t	181	322	504	226	402	629	258	458	716
100,000	166,004t	183	325	508	229	406	635	261	463	724
120,000	200,083t	184	328	512	231	411	641	264	469	732
150,000	251,896t	186	330	516	233	415	648	267	474	741
200,000	327,735t	187	333	520	236	419	654	270	479	749
250,000	401,268t	188	334	522	237	421	658	271	482	754
330,000	548,268t	189	336	525	239	424	663	274	486	760
370,000	627,016t	189	337	526	239	425	664	274	488	762
480,000	795,540t	190	338	528	240	427	666	273	490	765

Data Tables

Continued - Table 11 Kinetic energy (kj) at ship berthing

Ship B	Ship A	7,000 DWT			8,000 DWT			10,000DWT		
	Assumed W	14,0841 t			16,066 t			20,373 t		
DWT	Assumed W	0.3m/s	0.4m/s	0.5m/s	0.3m/s	0.4m/s	0.5m/s	0.3m/s	0.4m/s	0.5m/s
5,000	10,594t									
6,000	12,184t									
7,000	14,084t	162	287	449						
8,000	16,066t	172	306	478	184	328	512			
10,000	20,373t	191	340	531	206	366	573	162	274	416
12,000	23,851t	203	361	365	220	392	612	175	296	448
15,000	29,493t	219	389	608	239	424	663	192	325	492
17,000	33,056t	227	403	630	248	441	689	201	339	514
20,000	38,623t	237	421	358	260	463	723	213	359	544
25,000	45,946t	247	440	687	273	486	759	225	380	576
30,000	56,093t	258	459	718	287	510	796	238	403	610
35,000	63,084t	264	470	734	294	522	816	245	415	628
40,000	72,771t	271	481	752	302	537	839	254	429	649
45,000	77,986t	274	487	761	306	544	849	257	435	659
50,000	89,818t	279	497	776	313	556	869	265	447	678
60,000	104,300t	285	506	791	320	568	888	272	459	695
65,000	114,637t	288	512	800	323	575	898	276	466	706
70,000	122,108t	290	515	805	326	579	905	278	470	712
80,000	136,972t	293	521	814	330	587	917	283	478	724
85,000	143,359t	294	523	818	332	589	921	284	480	728
100,000	166,004t	298	530	828	336	598	934	289	489	740
120,000	200,083t	302	537	839	341	607	948	295	498	754
150,000	251,896t	306	544	850	347	616	963	300	508	769
200,000	327,735t	310	551	861	351	625	976	306	517	783
250,000	401,268t	312	555	867	355	630	985	309	522	791
330,000	548,670t	315	560	875	358	637	995	313	529	801
370,000	627,016t	316	562	878	360	639	999	314	531	805
480,000	795,540t	318	565	882	361	643	1004	317	535	810

Data Tables

Continued - Table 11 Kinetic energy (kj) ship to ship berthing

	Ship A	12,000 DWT			15,000 DWT			17,000 DWT		
Ship B	Assumed W	23,851t			29,493t			33,056t		
DWT	Assumed W	0.25	0.325	0.4m/s	0.25	0.325	0.4m/s	0.25	0.325	0.4m/s
10,000	20,373t									
12,000	23,851t	190	321	487						
15,000	29,493t	210	355	235	397	602				
17,000	33,056t	221	373	565	248	420	636	263	445	674
20,000	38,623t	235	397	602	267	450	682	284	480	727
25,000	45,946t	250	423	641	286	484	733	306	518	784
30,000	56,093t	267	451	683	308	521	789	331	360	849
35,000	63,084t	276	466	706	320	541	820	346	584	885
40,000	72,771t	286	484	733	334	565	856	362	612	927
45,000	77,986t	291	492	745	341	576	873	370	625	947
50,000	89,818t	300	508	769	354	598	906	385	651	986
60,000	104,300t	309	523	792	366	619	938	400	676	1024
65,000	114,637t	315	532	806	374	632	957	409	691	1047
70,000	122,108t	318	537	814	379	640	969	415	701	1061
80,000	136,972t	324	347	829	387	654	990	424	717	1086
85,000	143,359t	326	551	834	390	659	998	428	724	1096
100,00	166,004t	332	562	851	399	675	1022	439	742	1125
120,000	200,083t	340	574	869	410	692	1049	452	764	1157
150,000	251,896t	347	587	889	421	711	1077	466	787	1192
200,000	327,735t	354	599	907	431	729	1104	479	809	1225
250,000	401,268t	359	606	919	438	740	1121	487	823	1246
330,000	548,670t	364	616	933	446	754	1142	497	840	1272
370,000	627,016t	366	619	937	449	759	1149	500	846	1281
480,000	795,540t	369	624	945	453	766	1160	506	855	1295

Data Tables

Continued - Table 11 Kinetic energy (kj) ship to ship berthing

	Ship A	20,000DWT			25,000 DWT			30,000 DWT		
Ship B	Assumed w	38,623t			45,946t			56,093t		
DWT	Assumed w	0.25	0.325	0.4 m/s	0.25	0.325	0.4m/s	0.25	0.325	0.4 m/s
20,000	38,623t	308	520	788						
25,000	45,946t	334	565	856	366	619	937			
30,000	56,093t	365	616	933	403	680	1031	447	755	1144
35,000	63,084t	382	645	977	424	716	1085	473	800	1211
40,000	72,711t	402	680	1029	449	759	1149	505	853	1292
45,000	77,986t	412	696	1054	461	779	1180	520	879	1331
50,000	89,818t	430	727	1102	484	819	1240	550	930	1409
60,000	104,300t	449	759	1150	508	859	1301	581	982	1488
65,000	114,637t	460	778	1179	523	883	1338	600	1014	1537
70,000	122,108t	468	790	1197	532	899	1362	613	1035	1568
80,000	136,972t	480	811	1229	548	927	1404	634	1072	1624
85,000	143,359t	485	820	1241	555	937	1420	643	1086	1645
100,000	166,004t	499	844	1278	574	969	1468	668	1129	1711
120,000	200,083t	516	872	1321	596	10006	1552	698	1180	1787
150,000	253,896t	534	902	1366	619	1047	1585	731	1236	1872
200,000	327,735t	551	931	1410	642	1085	1644	763	1290	1954
250,000	401,268t	562	949	1437	657	1110	1682	784	1326	2008
330,000	548,670t	575	972	1472	676	1142	1730	811	1371	2076
370,000	627,016t	580	980	1484	682	1153	1747	821	1387	2101
480,000	795,540t	587	992	1503	692	1170	1772	835	1411	2138

Data Tables

Continued - Table 11 Kinetic energy (kj) ship to ship berthing

	Ship A	35,000 DWT			40,000 DWT			45,000 DWT		
Ship B	Assumed W	63,084t			72,771t			77,986t		
DWT	Assumed w	0.25	0.325	0.4 m/s	0.25	0.325	0.4 m/s	0.25	0.325	0.4 m/s
20,000	38,623t									
25,000	45,946t									
30,000	56,093t									
35,000	63,084t	503	850	1287						
40,000	72,711t	539	910	1379	580	980	1485			
45,000	77,986t	556	939	1423	600	1014	1536	621	1050	1591
50,000	89,818t	591	998	1512	641	1083	1640	665	1124	1703
60,000	104,300t	626	1059	1604	683	1155	1749	711	1202	1821
65,000	114,637t	649	1096	1660	709	1199	1816	740	1250	1894
70,000	122,108t	663	1120	1697	727	1228	1860	758	1282	1942
80,000	136,972t	688	1163	1762	757	1280	1939	792	1338	2027
85,000	143,359t	698	1180	1787	769	1300	1969	805	1360	2061
100,000	166,004t	729	1231	1865	806	1363	2064	846	1429	2165
120,000	200,083t	764	1292	1957	850	1437	2177	894	1511	2289
150,000	251,896t	804	1359	2058	900	1521	2304	949	1604	2430
200,000	327,735t	843	1425	2158	949	1604	2430	1004	1697	2570
250,000	401,268t	869	1468	2224	982	1659	2513	1041	1759	2664
330,000	548,670t	902	1524	2308	1024	1731	2621	1088	1839	2786
370,000	627,016t	913	1544	2339	1039	1756	2660	1105	1868	2830
480,000	795,540t	932	1574	2385	1063	1796	2720	1132	1913	2898

Data Tables

Continued - Table 11 Kinetic energy (kj) ship to ship berthing

	Ship A	50,000 DWT			60,000 DWT			65,000 DWT		
Ship B	Assumed W	89,818t			104,300t			114,637t		
DWT	Assumed W	0.2 m/s	0.25	0.3 m/s	0.2 m/s	0.25	0.3m/s	0.2 m/s	0.25	0.3 m/s
40,000	72,771t									
45,000	77,986t									
50,000	89,818t	458	716	1031						
60,000	104,300t	492	769	1108	532	831	1197			
65,000	114,637t	514	803	1156	557	870	1253	585	914	1315
70,000	122,108t	528	825	1188	574	897	1291	603	942	1357
80,000	136,972t	553	865	1245	604	944	1359	637	995	1432
85,000	143,359t	563	880	1267	616	962	1386	650	1015	1462
100,000	166,004t	594	929	1338	653	1021	1470	692	1081	1556
120,000	200,083t	632	988	1423	699	1093	1573	743	1162	16763
150,000	251,896t	675	1055	1520	752	1176	1693	804	1256	1808
200,000	327,735t	719	1124	1618	807	1261	1816	866	1354	1949
250,000	401,268t	749	1170	1684	844	1319	1900	909	1421	2046
330,000	548,670t	787	1230	1771	894	1397	2011	967	1511	2176
370,000	627,016t	801	1252	1803	912	1425	2052	989	1545	2224
480,000	795,540t	823	1286	1852	941	1470	2116	1022	1597	2300

	Ship A	70,000 DWT			80,000 DWT			85,000 DWT		
Ship B	Assumed W	122,108t			136,972t			143,359t		
DWT	Assumed W	0.2 m/s	0.25	0.3m/s	0.2 m/s	0.25	0.3m/s	0.2 m/s	0.25	0.3 m/s
65,000	114,637t									
70,000	122,108t	623	973	1401						
80,000	136,972t	658	1029	1482	699	1091	1572			
85,000	143,359t	673	1051	1513	714	1116	1608	731	1142	1645
100,000	166,004t	718	1121	1615	765	1196	1722	785	1225	1765
120,000	200,083t	773	1209	1740	829	1296	1866	852	1331	1917
150,000	251,896t	839	1311	1887	905	1414	2036	932	1456	2097
200,000	327,735t	907	1418	2042	985	1540	2217	1017	1589	2289
250,000	401,268t	955	1492	2149	1042	1627	2344	1077	1683	2424
330,000	548,670t	1019	1592	2292	1118	1747	2516	1159	1811	2609
370,000	627,016t	1042	1629	2346	1147	1792	2580	1190	1860	2678
480,000	795,540t	1080	1687	2429	1192	1862	2682	1239	1936	2788

Data Tables

Continued - Table 11 Kinetic energy (kj) ship to ship berthing

	Ship A	100,000 DWT			120,000 DWT			150,000 DWT		
Ship B	Assumed W	166,004t			200,083t			251,896t		
DWT	Assumed W	0.15	0.185	0.22	0.15	0.185	0.22	0.15	0.185	0.22
100,000	166,004t	476	724	1024						
120,000	200,083t	521	792	1120	574	873	1235			
150,000	251,896t	574	873	1235	640	973	1376	723	1099	1554
200,000	327,735t	632	962	1360	713	1084	1533	817	1243	1758
250,000	401,268t	674	1025	1449	766	1165	1648	888	1351	1910
330,000	548,670t	731	1112	1573	841	1280	1810	991	1507	2131
370,000	627,016t	753	1146	1620	870	1324	1872	1031	1568	2218
480,000	795,540t	788	1199	1695	917	1395	1973	1098	1670	2361

	Ship A	200,000 DWT			250,000 DWT			330,000 DWT		
Ship B	Assumed W	327,735t			401,268t			548,670t		
DWT	Assumed W	0.15	0.185	0.22	0.15	0.185	0.22	0.15	0.185	0.22
100,000	166,004t									
120,000	200,083t									
150,000	251,896t									
200,000	327,735t	940	1430	2022						
250,000	401,268t	1035	1574	2226	1151	1751	2476			
330,000	548,670t	1177	1791	2532	1330	2023	2860	1574	2394	3386
370,000	627,016t	1235	1878	2656	1404	2135	3020	1679	2554	3611
480,000	795,540t	1332	2026	2865	1530	2328	3292	1863	2834	4008

	Ship A	370,000DWT			480,000 DWT		
Ship B	Assumed W	122,108t			136,972t		
DWT	Assumed W	0.15	0.185	0.22	0.15		0.22
250,000	401,268t						
330,000	548,670t						
370,000	627,016t	1799	2736	3869			
480,000	795,540t	2012	6060	4328	2282	3471	4909

Data Tables

Table 12 - Examples used to medium and small ships

DWT	Fender size Diameter (m) x length (m)	Ship Kinds
50	0.5 x 1.0	Fishing vessels
100	0.7 x 1.5 ~1.0 x 1.5	Fishing vessels
200	1.0 x 1.8 ~ 1.0 x 2.0	Fishing vessels and towing vessels
300-500	1.2 x 2.0 ~1.5 x 2.5	Fishing vessels and towing vessels
1,000	1.5 x 2.5 ~ 1.5 x 3.0	Towing vessels and freighters
3,000	2.0 x 3.0 ~ 2.0 x 3.5	Ocean trawlers and freighters
10,000	2.0 x 3.5 ~ 2.5 x 5.0	Freighters

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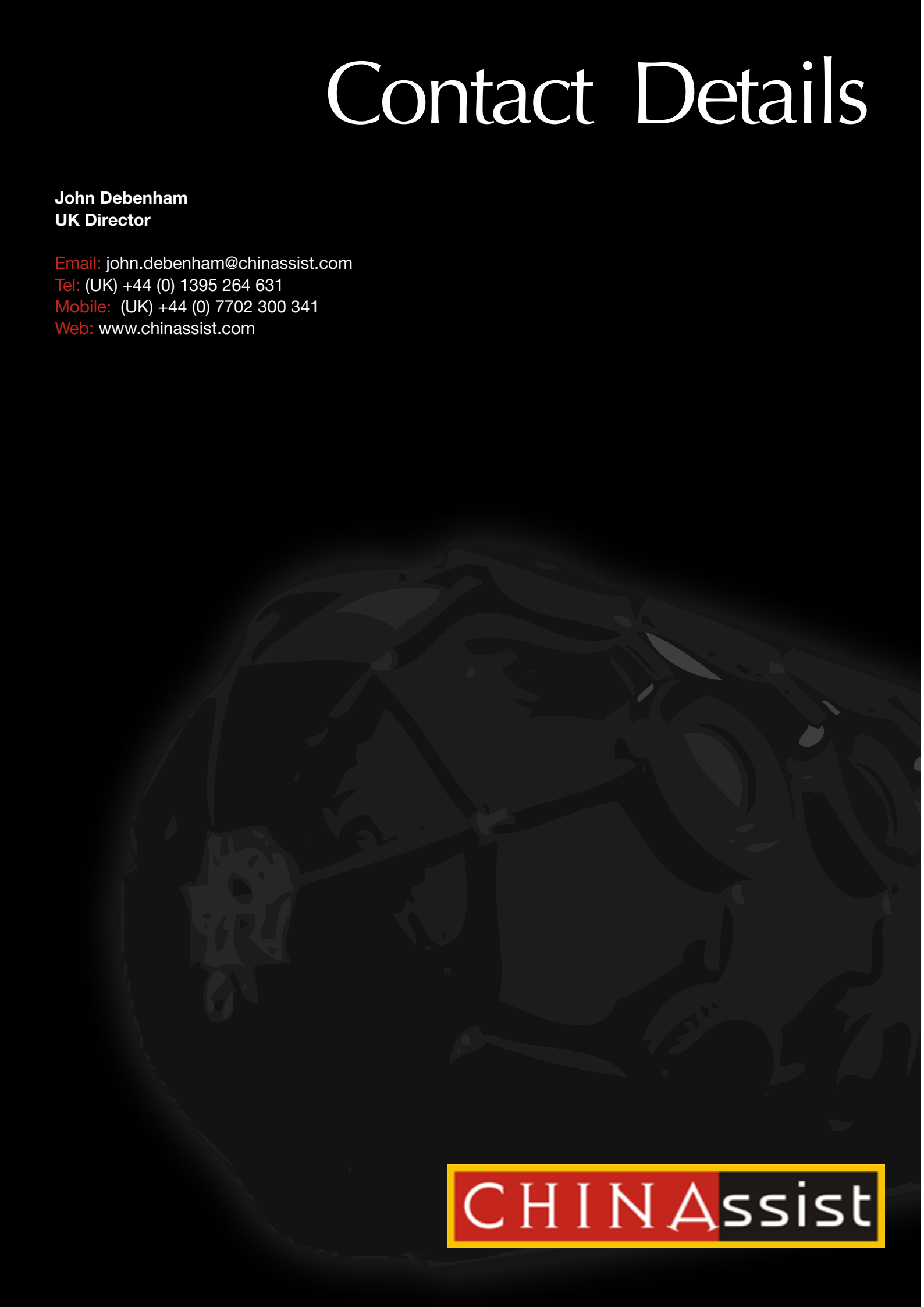

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