

# 鹿島港船舶航行安全の手引き（第3版）

1. 悪天候に伴う海難の状況
2. 津波来襲時における被害の状況等
3. 鹿島港における気象・海象情報等入手先
4. 勧告発出基準・情報伝達系統
5. 鹿島港運航調整自主ルール



令和5年6月

鹿島港災害対策協議会

## はじめに

鹿島港においては、平成18年10月、悪天候に伴い鉱石運搬船「G号」（98,587トン、パナマ船籍）、貨物船「O号」（88,853トン、香港船籍）、石炭輸送船「E号」（85,350トン、パナマ船籍）が相次いで座礁する事故が発生した。

これら一連の座礁事故を踏まえて、現地の関係者により「鹿島港座礁事故を踏まえた現地連絡会議」(※)が設置され、情報共有のあり方や今後の再発防止のための対策が検討され、鹿島港船舶航行安全の手引き（第1版）がまとめられた。

### 大型鉱石運搬船の座礁状況



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また、平成23年3月11日に発生した東日本大震災では、港内に在泊中の危険物積載船を含む多数の船舶が津波の襲来を受け、係留索の破断等により漂流し岸壁や他船と接触する事故が発生、港内在泊船舶や港湾施設等に甚大な被害が生じた。

これを踏まえ、鹿島港災害対策協議会では、津波来襲時における船舶の措置要領の見直し、港外避難時の順序、勧告の情報伝達の方法等について再確認を行い、鹿島港船舶航行安全の手引き（第2版）がまとめられた。

### 漂流し他船と接触する大型タンカー



### 津波により漂流・座礁した貨物船



本手引きは、これら異常気象時に講じる事故防止対策のほか、鹿島港を出入港する船舶が通常時から講じる安全対策について、鹿島港を利用する全ての関係者の理解を深め、より実効性のある対策を講じることができるよう取りまとめたものである。

# 1. 悪天候に伴う海難の状況

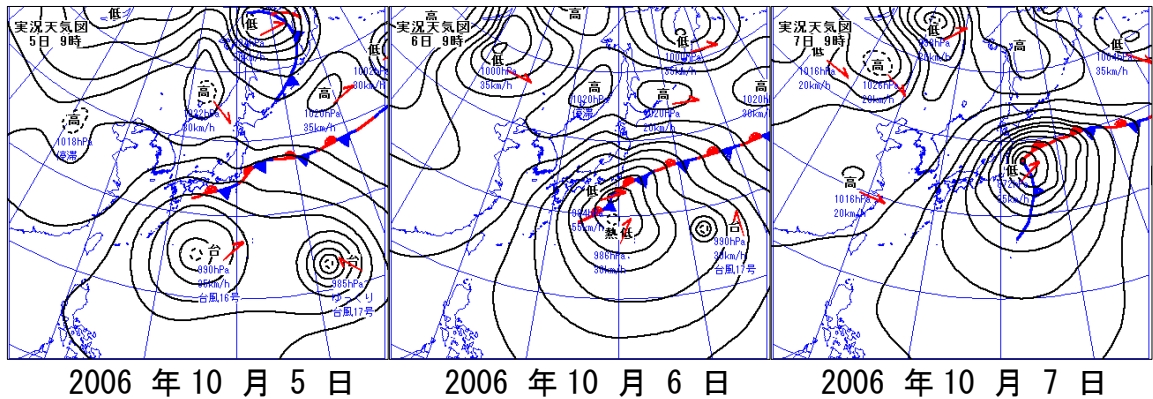
## 1.1 過去の海難発生事例

NO	種類	発生年月日時間	場所	船名等	概要
1	衝突	平成8(1996)年 9月14日 午後5時20分	「港内」	V号 セントビンセント籍 3986t	同船は、鹿島港南公共埠頭A岸壁を離岸し、鹿島港中央水路方向へ航行を開始したが、折からの東の強風により保針困難となり、着岸中のY丸、さらにK丸に衝突し、護岸に押しつけられた。
2	乗揚げ (走錨)	平成10(1998)年 1月15日 午後11時30分	「港内」	S号 ペリイズ籍 1257t	同船はバース待ちの為、鹿島港域の錨地にて錨泊中、発達した低気圧の影響により、走錨し乗揚げた。
3	衝突 (走錨)	平成10(1998)年 2月21日 午前3時39分	「港外」	D号 中国籍 4462t	同船は、バース待ちの為、鹿島港南防波堤灯台沖に錨泊中、天候悪化に伴い、自船が走錨し付近に錨泊中であつたS号(14147トン)と衝突した。
4	衝突 (走錨)	平成10(1998)年 2月21日 午前3時39分	「港外」	S号 キプロス籍 14147t	同船は、鹿島港南防波堤灯台沖において錨泊中、走錨しD号(4462トン)と衝突した。
5	乗揚げ (走錨)	平成10(1998)年 2月21日 午前2時零分	「港内」	Z丸 日本(愛媛県) 497t	同船は、バース待ちのため、鹿島港北防波堤灯台沖に錨泊中、走錨し乗揚げた。
6	乗揚げ (走錨)	平成11(1999)年 3月8日 午前3時55分	「港内」	M丸 日本(愛媛県) 498t	同船は、検査錨地に一旦錨泊後、船倉の掃除を行うため、北浜に転錨した。その後、北東からの強風及び高波により走錨し乗揚げた。
7	乗揚げ (走錨)	平成18(2006)年 10月6日 夕刻	「港外」	G号 パナマ籍 98587t	同船は、鹿島港外において錨泊中であつたが、強風下、沖合いに避難すべく抜錨作業中に、走錨し始め揚錨不可能な状況になり、捨錨するも操船不能のまま、鹿島港南防波堤灯台の東5マイル付近に乗揚げた。その後船体は風浪により船首部、船倉部及び船尾部の3つに切断。
8	乗揚げ	平成18(2006)年 10月24日 午後昼過ぎ	「港内」	O号 中国籍 88853t	同船は、鹿島港に入港し荷役中であつたが、強風下、荒天避泊のため沖出し出港中、南防波堤先端に衝突した。その後、同防波堤外側に沿って右舷側横付け状態で風に圧流され、乗揚げた。
9	乗揚げ	平成18(2006)年 10月24日 夜	「港内」	E号 パナマ籍 85350t	同船は、鹿島港に入港中であつたが、荒天避泊のため沖だし出港中、強風のため航行困難となり圧流され、鹿島港南防波堤先端から南西約1キロメートル付近に乗揚げた。

※平成8年～平成18年の間に発生した海難事例

## 1.2 気圧配置の状況

### <海難 No7>



### <海難 No8, 9>

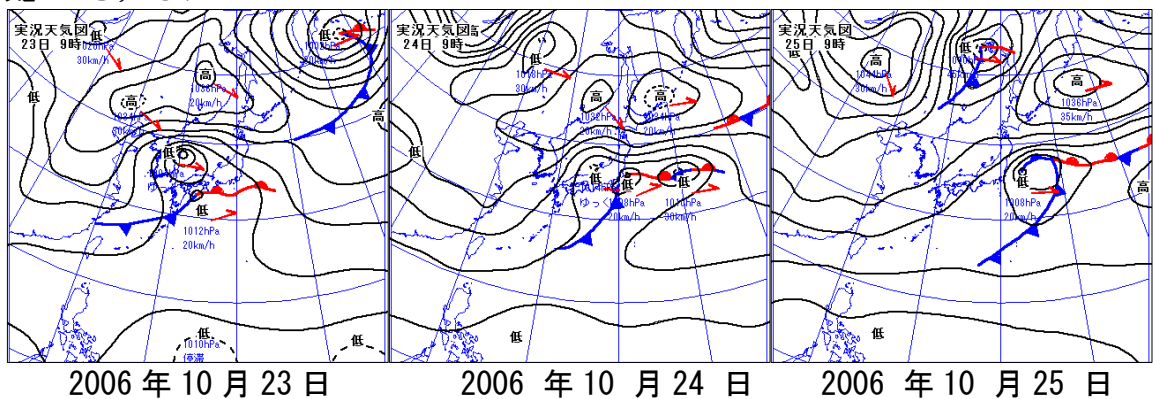


図-2.1 天気図

### <海難 No7>

本州の南岸に停滞した前線の活動が、台風の接近に伴い活発となった。また、四国沖で前線上に発生した低気圧が、急速に発達しながら本州の南岸を進み、さらに発達しながら三陸沖、北海道の東方海上に進んだ。

### <海難 No8, 9>

前線を伴った低気圧が本州南岸を通過した。低気圧はあまり発達しなかった（最低中心気圧は 1008hPa）が、北海道の北東にある高気圧との間で等圧線の間隔が密になり、関東地方の沿岸部を中心に北寄りの風が強く吹き続いた。この低気圧は、動きが非常に遅く、強風が長時間継続した。

- 日本の北側に優勢な高気圧があり、本州の南端を低気圧が通過する場合、鹿島港近傍では強い北東風が吹き続けることが多い。
- 港口が北東方向に向いている鹿島港では要注意の気圧配置である。

### 1.3 風と波の状況

表-1.3.1 鹿島港における観測値

要素		海難 No7	海難 No8, 9
風向	(16 方位)	N~NE	NW~N~NE
最大風速	(m/s)	14.1	15.8
最大有義波	波高 (m)	5.89	6.78
	周期 (s)	13.3	11.7

- ※ 速報値である。また、両ケースとも欠測が多くピークが取れていない可能性がある。
- ※ 最大風速：観測された平均風速の最大値
- ※ 最大有義波：観測された有義波の最大値
- ※ 有義波高・有義波周期：観測された波高の大きい方から数えて 1/3 の個数の波高・周期の平均値
- ※ 風向・風速は鹿島港泉川浜屋敷における地上 10m の観測データ

### 1.4 海難発生その他の要因

鹿島港沿岸の海底の表層は沿岸流の影響で形成された砂・砂礫層が主体であるところから錨地に適していない海域である。これまでも荒天時に船舶の走錨が多発している。

### 1.5 波が高いケース

※①上段は出現回数、下段( )内は出現率(%)を示す。②偶数時について統計したものである。

測得回数	45620(96.1)
欠測回数	1864(3.9)

期間：1996年1月～2006年10月 表-2.1.1 波高・周期出現頻度表

周期(sec) 波高(cm)	3.0sec 未満	3.0 ~4.0	4.0 ~5.0	5.0 ~6.0	6.0 ~7.0	7.0 ~8.0	8.0 ~9.0	9.0 ~10.0	10.0 ~11.0	11.0 ~12.0	12.0 ~13.0	13.0 ~14.0	14.0 ~15.0	15.0 ~16.0	16.0 ~17.0	17.0sec 以上	合計	累計
901cm 以上																		
801~900																		
701~800							1 (0.0)										1 (0.0)	45620 (100.0)
651~700																		45619 (100.0)
601~650									4 (0.0)	1 (0.0)	4 (0.0)						9 (0.0)	45619 (100.0)
551~600							2 (0.0)		7 (0.0)	4 (0.0)	5 (0.0)	5 (0.0)	1 (0.0)				24 (0.1)	45610 (100.0)
501~550								8 (0.0)	15 (0.0)	7 (0.0)	17 (0.0)	2 (0.0)	1 (0.0)				50 (0.1)	45586 (99.9)
451~500						1 (0.0)	2 (0.0)	14 (0.0)	11 (0.0)	18 (0.0)	13 (0.0)	12 (0.0)	2 (0.0)	2 (0.0)			75 (0.2)	45536 (99.8)
401~450						3 (0.0)	17 (0.0)	15 (0.0)	14 (0.0)	18 (0.0)	39 (0.1)	20 (0.0)	14 (0.0)	4 (0.0)	3 (0.0)		147 (0.3)	45461 (99.7)
351~400						23 (0.1)	51 (0.1)	58 (0.1)	26 (0.1)	41 (0.1)	43 (0.1)	22 (0.0)	13 (0.0)	3 (0.0)	3 (0.0)		283 (0.6)	45314 (99.3)
301~350					8 (0.0)	115 (0.3)	103 (0.2)	100 (0.2)	59 (0.1)	95 (0.2)	80 (0.2)	29 (0.1)	8 (0.0)	5 (0.0)	1 (0.0)		603 (1.3)	45031 (98.7)
251~300				1 (0.0)	137 (0.3)	309 (0.7)	194 (0.4)	251 (0.6)	224 (0.5)	207 (0.5)	100 (0.2)	45 (0.1)	25 (0.1)	4 (0.0)	2 (0.0)	1 (0.0)	1500 (3.3)	44428 (97.4)
201~250				61 (0.1)	654 (1.4)	649 (1.4)	519 (1.1)	509 (1.1)	452 (1.0)	331 (0.7)	153 (0.3)	103 (0.2)	32 (0.1)	10 (0.0)	3 (0.0)		3476 (7.6)	42928 (94.1)
176~200			1 (0.0)	183 (0.4)	572 (1.3)	532 (1.2)	544 (1.2)	509 (1.1)	425 (0.9)	266 (0.6)	124 (0.3)	37 (0.1)	16 (0.0)	10 (0.0)	3 (0.0)	2 (0.0)	3224 (7.1)	39452 (86.5)
151~175			4 (0.0)	406 (0.9)	752 (1.6)	819 (1.8)	831 (1.8)	752 (1.6)	476 (1.0)	229 (0.5)	108 (0.2)	29 (0.1)	26 (0.1)	4 (0.0)	1 (0.0)	2 (0.0)	4439 (9.7)	36228 (79.4)
126~150			40 (0.1)	708 (1.6)	1041 (2.3)	1197 (2.6)	1166 (2.6)	869 (1.9)	439 (1.0)	271 (0.6)	103 (0.2)	41 (0.1)	13 (0.0)	2 (0.0)			5890 (12.9)	31789 (69.7)
101~125			150 (0.3)	987 (2.2)	1510 (3.3)	1786 (3.9)	1717 (3.8)	1020 (2.2)	478 (1.0)	242 (0.5)	87 (0.2)	24 (0.1)	3 (0.0)				8004 (17.5)	25899 (56.8)
76~100		1 (0.0)	213 (0.5)	899 (2.0)	1692 (3.7)	2248 (4.9)	2053 (4.5)	1144 (2.5)	418 (0.9)	156 (0.3)	41 (0.1)	10 (0.0)	2 (0.0)				8877 (19.5)	17895 (39.2)
51~75		12 (0.0)	184 (0.4)	658 (1.4)	1415 (3.1)	2140 (4.7)	1935 (4.2)	898 (2.0)	229 (0.5)	84 (0.2)	12 (0.0)	8 (0.0)	1 (0.0)				7576 (16.6)	9018 (19.8)
26~50		6 (0.0)	38 (0.1)	121 (0.3)	338 (0.7)	465 (1.0)	340 (0.7)	110 (0.2)	19 (0.0)	5 (0.0)							1442 (3.2)	1442 (3.2)
合計		19 (0.0)	630 (1.4)	4024 (8.8)	8119 (17.8)	10287 (22.5)	9475 (20.8)	6257 (13.7)	3292 (7.2)	1978 (4.3)	926 (2.0)	391 (0.9)	157 (0.3)	44 (0.1)	16 (0.0)	5 (0.0)	45620 (100.0)	

有義波高 4m 以上:0.67%≒2.4 回/年 有義波周期 10 秒以上:14.93%≒54.5 回/年 有義波高 4m 以上かつ有義波周期 10 秒以上:0.53%≒1.9 日/年  
 ※ 有義波高・有義波周期：観測された波高の大きい方から数えて 1/3 の個数の波高・周期の平均値

# 1.6 風が強いケース

海難 No8、9

海難 No7

規定回数	47484
測得回数	45467
欠測回数	2017(4.2)

起点：鹿島 期間：1996年01～2006年10月

表2. 2. 1 風向・風速出現頻度表

風向 風速(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	全方位	累計
15.0m/s 以上	2 (0.0)	1 (0.0)	2 (0.0)			1 (0.0)	3 (0.0)	1 (0.0)	3 (0.0)							1 (0.0)	14 (0.0)	45467 (100.0)
14.0~15.0	2 (0.0)	1 (0.0)	6 (0.0)		1 (0.0)	3 (0.0)		1 (0.0)	2 (0.0)								16 (0.0)	45453 (100.0)
13.0~14.0	2 (0.0)	2 (0.0)	5 (0.0)	1 (0.0)		4 (0.0)		1 (0.0)	4 (0.0)	10 (0.0)	1 (0.0)	1 (0.0)			1 (0.0)		32 (0.1)	45437 (99.9)
12.0~13.0	4 (0.0)	4 (0.0)	9 (0.0)	6 (0.0)	4 (0.0)	1 (0.0)	2 (0.0)	1 (0.0)	9 (0.0)	6 (0.0)					1 (0.0)		47 (0.1)	45405 (99.9)
11.0~12.0	14 (0.0)	11 (0.0)	8 (0.0)	5 (0.0)	3 (0.0)	2 (0.0)		1 (0.0)	12 (0.0)	13 (0.0)					2 (0.0)	1 (0.0)	72 (0.2)	45358 (99.8)
10.0~11.0	15 (0.0)	16 (0.0)	33 (0.1)	12 (0.0)	6 (0.0)	11 (0.0)	2 (0.0)	3 (0.0)	17 (0.0)	43 (0.1)	4 (0.0)				5 (0.0)		167 (0.4)	45286 (99.6)
9.0~10.0	26 (0.1)	39 (0.1)	76 (0.2)	18 (0.0)	13 (0.0)	10 (0.0)	3 (0.0)	5 (0.0)	38 (0.1)	81 (0.2)	14 (0.0)		2 (0.0)	7 (0.0)	7 (0.0)		339 (0.7)	45119 (99.2)
8.0~9.0	40 (0.1)	115 (0.3)	204 (0.4)	59 (0.1)	21 (0.0)	20 (0.0)	7 (0.0)	10 (0.0)	70 (0.2)	160 (0.4)	40 (0.1)	3 (0.0)	4 (0.0)	17 (0.0)	18 (0.0)	10 (0.0)	798 (1.8)	44780 (98.5)
7.0~8.0	90 (0.2)	268 (0.6)	458 (1.0)	118 (0.3)	53 (0.1)	28 (0.1)	33 (0.1)	17 (0.0)	115 (0.3)	309 (0.7)	76 (0.2)	13 (0.0)	14 (0.0)	46 (0.1)	40 (0.1)	22 (0.0)	1700 (3.7)	43982 (96.7)
6.0~7.0	217 (0.5)	595 (1.3)	778 (1.7)	245 (0.5)	103 (0.2)	70 (0.2)	82 (0.2)	32 (0.1)	175 (0.4)	485 (1.1)	136 (0.3)	31 (0.1)	32 (0.1)	94 (0.2)	81 (0.2)	46 (0.1)	3202 (7.0)	42282 (93.0)
5.0~6.0	399 (0.9)	907 (2.0)	969 (2.1)	466 (1.0)	217 (0.5)	227 (0.5)	166 (0.4)	52 (0.1)	216 (0.5)	685 (1.5)	156 (0.3)	81 (0.2)	102 (0.2)	183 (0.4)	166 (0.4)	91 (0.2)	5083 (11.2)	39080 (86.0)
4.0~5.0	842 (1.9)	1204 (2.6)	1131 (2.5)	624 (1.4)	425 (0.9)	415 (0.9)	322 (0.7)	109 (0.2)	242 (0.5)	1003 (2.2)	177 (0.4)	155 (0.3)	222 (0.5)	345 (0.8)	580 (1.3)	236 (0.5)	8032 (17.7)	33997 (74.8)
3.0~4.0	1331 (2.9)	1285 (2.8)	1103 (2.4)	731 (1.6)	620 (1.4)	448 (1.0)	398 (0.9)	198 (0.4)	289 (0.6)	1536 (3.4)	229 (0.5)	202 (0.4)	355 (0.8)	452 (1.0)	1417 (3.1)	507 (1.1)	11101 (24.4)	25965 (57.1)
2.0~3.0	1217 (2.7)	882 (1.9)	809 (1.8)	564 (1.2)	640 (1.4)	392 (0.9)	389 (0.9)	243 (0.5)	245 (0.5)	1233 (2.7)	190 (0.4)	111 (0.2)	221 (0.5)	308 (0.7)	1483 (3.3)	772 (1.7)	9699 (21.3)	14864 (32.7)
1.0~2.0	486 (1.1)	417 (0.9)	405 (0.9)	329 (0.7)	371 (0.8)	324 (0.7)	246 (0.5)	165 (0.4)	238 (0.5)	238 (0.5)	71 (0.2)	21 (0.0)	46 (0.1)	113 (0.2)	440 (1.0)	430 (0.9)	4340 (9.5)	5165 (11.4)
1.0m/s未満	64 (0.1)	55 (0.1)	67 (0.1)	70 (0.2)	85 (0.2)	67 (0.1)	67 (0.1)	67 (0.1)	71 (0.2)	49 (0.1)	20 (0.0)	8 (0.0)	10 (0.0)	25 (0.1)	53 (0.1)	47 (0.1)	825 (1.8)	825 (1.8)
合計	4751 (10.4)	5802 (12.8)	6061 (13.3)	3250 (7.1)	2562 (5.6)	2023 (4.4)	1720 (3.8)	906 (2.0)	1746 (3.8)	5851 (12.9)	1114 (2.5)	626 (1.4)	1008 (2.2)	1590 (3.5)	4294 (9.4)	2163 (4.8)	45467 (100.0)	

※ ①上段は出現回数、下段( )内は出現率(%)を示す。②偶数時について統計したものである。③風向・風速は鹿島港泉川浜屋敷における地上10mの観測データ

風向が N~NE かつ風速が 10m/s 以上 0.3% ≒ 1.0 日/年

# 1.7 波及び風がともに特に強いケース

過去 35 年間 (1972~2006) のデータの中で、No8, 9の海難が発生した気象、海象を上回った回数は1回であった。

対象期間 (年月日時-年月日時)						最大有義波高 (m)	最大有義波周期 (sec)	最多波向 (16 方位)	最大風速 (m/s)			
1975	11	10	6	-	1975	11	13	18	7.09	14.8	-	13.7
1980	10	3	6	-	1980	10	5	18	6.52	14.9	-	10.6
1980	11	26	12	-	1980	12	3	10	7.06	13.7	-	11.7
1980	12	23	20	-	1980	12	27	4	6.32	13.4	-	12.1
1986	3	23	4	-	1986	3	25	22	6.67	12.7	-	20.2
1992	11	7	10	-	1992	11	9	22	6.69	12.7	ENE	14.7
1993	3	8	0	-	1993	3	10	22	6.70	13.8	NE	11.8
2001	1	26	4	-	2001	1	28	20	7.33	12.3	ENE	14.8
2005	1	15	14	-	2005	1	18	16	6.21	13.5	NE	12.7
2006	10	23	12	-	2006	10	26	12	6.47	12.0	ENE	15.8

※①2006年については速報値である。②風向・風速は鹿島港泉川浜屋敷における地上10mの観測データ

抽出条件 1.最大有義波高 6m 以上かつ、  
2.最大有義波周期 12 秒以上かつ、  
3.最大風速 10m/s 以上

※ 最大有義波：観測された有義波高の最大値  
 ※ 有義波高・有義波周期：観測された波高の大きい方から数えて 1/3 の個数の波高・周期の平均値  
 ※ 最大風速：観測された平均風速の最大値

## 2. 津波来襲時における被害の状況等

### 2.1 東北地方太平洋沖地震（東日本大震災）（気象庁発表資料等より。）

平成 23 年（2011 年）3 月 11 日（金）午後 2 時 46 分発生

規模マグニチュード 9.0

最大震度 7（鹿嶋市最大震度 6 弱、神栖市最大震度 6 弱）

鹿島港津波第 1 波来襲時刻 午後 3 時 32 分頃

津波最大波 午後 4 時 40 分頃、高さ 5.7m

### 2.2 主な船舶の被害状況（鹿島海上保安署による調査より。）

番号	船種	総トン数	概要
1	貨物船	499トン	津波により係留索破断。漂流状態となり、他船と衝突後、航行不能。
2	タンカー	160,066 トン	津波により係留索破断。漂流状態となり、他船と衝突しつつも、自力にて港外退避。
3	タンカー	47,027 トン	津波により係留索破断。漂流状態となり、岸壁に接触。機関室に浸水を認めるも、乗員修理の後、自力にて港外退避。
4	タンカー	5,998 トン	津波により岸壁に接触、係留索破断により漂流状態となる。その後、同船乗組員が移乗し機関室に浸水を認め自力航行不可と判断し、タグボートの支援を受け北公共ふ頭D岸壁着岸。
5	貨物船	499 トン	津波により係留索破断。漂流状態となり、港内で座礁。その後、タグボートで同船乗組員が移乗し、離礁のうえ港外退避。
6	貨物船	22,089 トン	津波により係留索破断。漂流状態となり他船と衝突しつつも、自力にて港外退避。
7	貨物船	106,333 トン	津波により係留索破断。漂流中に本船錨鎖と他船錨鎖が絡み、また、機関室に浸水を認める。その後、タグボートの支援を受け港外退避。
8	貨物船	91,178 トン	津波により係留索破断。漂流状態となり、東京電力(株)取水口前で座礁。その後、座礁位置にて、積荷の瀝取りを実施し離礁。
9	貨物船	27,989 トン	津波により係留索破断。両舷錨を投錨したが右舷錨鎖が切れ岸壁に衝突。その後、自力にて港外退避。
10	貨物船	36,008 トン	津波により係留索破断。漂流状態となるも、自力航行にて岸壁着岸。
11	貨物船	14,286 トン	津波により係留索破断。漂流状態となり岸壁に衝突するも南水路内で錨泊。その後、自力航行にて港外退避。
12	貨物船	25,448 トン	津波により係留索破断。漂流状態となるも自力にて港外退避。

### 3. 鹿島港における気象・海象情報等入手先

(1) ナウファス（全国港湾海洋波浪情報網）

URL <https://www.mlit.go.jp/kowan/nowphas/>

(2) 茨城海上保安部

① 海の安全情報

パソコン <https://www6.kaiho.mlit.go.jp/03kanku/ibaraki/>

携帯電話 <https://www6.kaiho.mlit.go.jp/m/03kankuibaraki/>

スマートフォン <https://www6.kaiho.mlit.go.jp/sp/>

② テレフォンサービス 029-264-0177

(3) 水戸地方気象台ホームページ

URL <https://www.jma-net.go.jp/mito/>

(4) その他

鹿島港情報図

日本語版  
鹿島港情報図

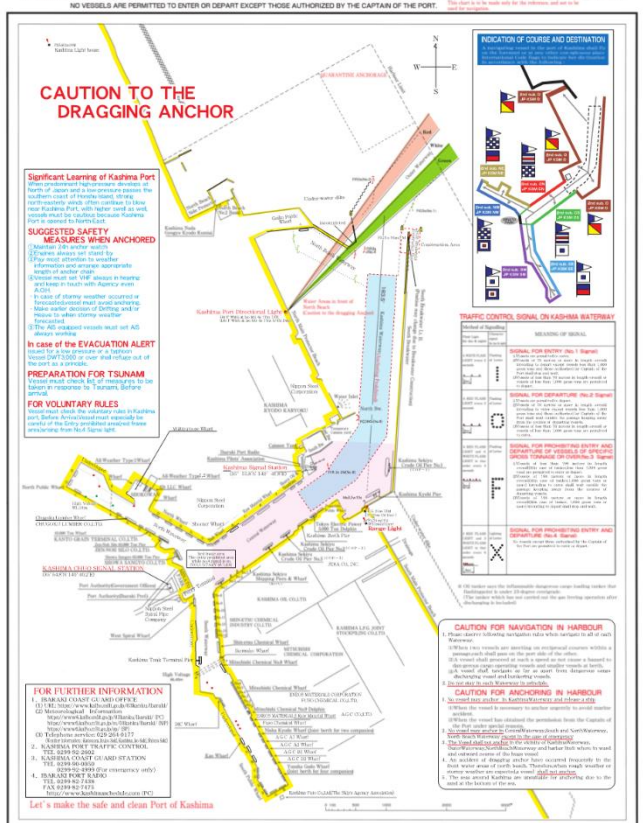


鹿島海上保安署監修

海上保安協会 鹿島支部  
鹿島港 船務代理店  
鹿島港 災害対策協議会

2022年12月

英語版  
TRAFFIC INFORMATION CHART IN KASHIMA PORT



COAST GUARD ASSOCIATION, KASHIMA BRANCH  
THE SHIP'S AGENCY ASSOCIATION OF KASHIMA PORT  
KASHIMA PORT DISASTER COUNCIL

2022 DEC.

**\*鹿島港情報図については、港長窓口等で配布しております。  
また、茨城海上保安部ホームページから閲覧することができます。\***



## 4. 勧告発出基準・情報伝達系統

(令和5年6月5日、鹿島港災害対策協議会策定)

### 4.1 台風接近時における対応

#### (1) 勧告発出の根拠・基準

##### ① 発出根拠

港長は、異常な気象又は海象、海難の発生その他の事情により特定港内において船舶交通の危険を生ずるおそれがあると予想される場合において、必要があると認めるときは、特定港内又は特定港の境界付近にある船舶に対し、危険の防止の円滑な実施のために必要な措置を講ずべきことを勧告することができる。(港則法第39条第4項)

##### ② 発出基準

当港が台風の強風域に入ると予想される場合に勧告を行うものとし、勧告の種類及び時期は次のとおりとする。

○第一警戒体制(準備体制) 当港が強風域に入ると予想される9時間前

○第二警戒体制(避難勧告) 当港が強風域に入ると予想される6時間前

#### (2) 勧告発出・解除の伝達方法

「鹿島港災害対策協議会台風等対策会議連絡系統図」に基づき、船舶代理店等を経由し港内在泊船等に伝達する。

#### (3) 勧告発出時における対応

<p>第一警戒体制 (準備体制)</p>	<ul style="list-style-type: none"> <li>• 在港船は荒天準備をなし、必要に応じ直ちに運航できるよう準備すること</li> <li>• 危険物の荷役及び港内工事作業等は、原則として中止すること</li> <li>• 工事用資機材等の流出防止の対策を講じること</li> <li>• 小型船舶の所有者及び小型船舶の係留施設の管理者は、陸揚げ、流出防止等の対策を講じること</li> <li>• AIS搭載船舶は、AISを常時作動させておくこと</li> <li>• 国際VHF無線機搭載船舶は、16chを常時聴取すること</li> <li>• 鹿島港仕向けの船舶がある代理店等は、当該船舶と連絡を行い、他の港等へ避難するよう調整すること</li> </ul>
<p>第二警戒体制 (避難勧告)</p>	<ul style="list-style-type: none"> <li>• 3,000DWT以上の船舶は、原則として、港外へ避難すること</li> <li>• 3,000DWT以上の錨泊中の船舶は、速やかに抜錨し、安全な海域にて漂泊すること</li> <li>• 3,000DWT未満の錨泊中の船舶は、代理店と調整し、岸壁での係留避泊又は他の港に避難すること</li> <li>• 港内において係留避泊する船舶は、増しもやい、機関の準備、定期的な係留状況の確認等の対策を実施すること</li> </ul>

#### (4) 勧告解除基準

次のいずれかに該当し、港内の安全が確認された場合に、港長と部会長が協議し勧告を解除するものとする。

- ① 当港が強風域から出たとき
- ② 当港が未だ強風域内にあるものの、発達した低気圧の接近に伴う勧告基準に満たない気象状況であり、天候が回復することが明らかなきとき

#### (5) その他留意事項等

- ① 同基準を運用することにより、都度の台風等対策協議会は原則として省略できるものとする。
- ② 警戒体制の勧告時間が夜間(概ね 17 時から翌朝 9 時)になる場合は、できる限り、16 時までに関告を発出するものとする。
- ③ 港内在泊船は、代理店等との通信手段を確保し、港長からの情報に留意するものとする。
- ④ 港内在泊船は、港長の勧告発出時期に囚われず、早期に荒天準備、港外避難を行う等、個々の状況に応じた臨機応変な対応を取ること。
- ⑤ 当港が強風域に入らない場合であっても、低気圧接近時の避難勧告基準値に達する場合は、低気圧接近時における避難勧告基準を適用する。
- ⑥ 必要に応じ勧告基準の見直しを行い、現状に即した基準とする。
- ⑦ 本勧告の発出時期の考え方については、平成 16 年 6 月の鹿島港災害対策協議会台風等対策専門部会資料による。(※資料添付省略)

### 4.2 発達した低気圧接近における対応

#### (1) 勧告発出の根拠・基準

##### ① 発出根拠

港長は、異常な気象又は海象、海難の発生その他の事情により特定港内において船舶交通の危険を生ずるおそれがあると予想される場合において、必要があると認めるときは、特定港内又は特定港の境界付近にある船舶に対し、危険の防止の円滑な実施のために必要な措置を講ずべきことを勧告することができる。(港則法第 39 条第 4 項)

##### ② 発出基準

日本気象協会から提供される鹿島港の気象予測により、次の条件の全てが満たされる気象が予想される場合に、原則として、同気象となる 24 時間前までに勧告を行う。

波向	北から東寄り (0 度~120 度)
波高 (有義波高)	4 m 以上
風速 (平均風速)	1.0 m/s 以上

なお、上記基準にかかわらず、港長及び部会長が協議のうえ、必要と認めるときは、同様の勧告を行う。

#### (2) 勧告発出・解除の伝達方法

「鹿島港災害対策協議会台風等対策協議連絡系統図」に基づき、船舶代理店等を經由し港内在泊船に伝達する。

### (3) 勧告発出時における対応

<p>3,000DWT 以上の船舶 (避難対象船舶)</p>	<ul style="list-style-type: none"> <li>• 係留中の船舶は、原則として、港外の安全な海域において漂泊避難すること</li> <li>• 鹿島港周辺海域において錨泊中の船舶は、速やかに抜錨し安全な海域にて漂泊避難すること</li> <li>• AIS 搭載船舶は、AIS を常時作動させておくこと</li> <li>• 国際 VHF 無線機搭載船舶は、16ch を常時聴取すること</li> </ul>
<p>3,000DWT 未満の船舶 (避難対象船舶以外の船舶)</p>	<ul style="list-style-type: none"> <li>• 港内及び周辺海域において錨泊中の船舶は、代理店等と調整し岸壁での係留避泊又は他の港等に避難すること</li> <li>• AIS 搭載船舶は、常時 AIS を作動させておくこと</li> <li>• 国際 VHF 無線機搭載船舶は、16ch を常時聴取すること</li> <li>• 港内において係留避泊する船舶は、増しめやい、機関の準備、定期的な係留状況の確認等の対策を実施すること</li> </ul>

#### (4) 勧告解除基準

平均風速が 10m/s 未満となり、港内の安全が確保された場合に、港長と部会長が協議し勧告を解除するものとする。

#### (5) その他留意事項等

- ① 避難優先順位については、港長(管制官)、水先人及び曳船運航者が調整のうえ決定する。
- ② 鹿島港仕向けの船舶がある代理店等は、当該船舶に連絡のうえ、他の港等において避難するよう調整する。
- ③ 港内在泊船は、港長の勧告発出時期に囚われず、早期に荒天準備、港外退避を行う等、個々の状況に応じた臨機応変な対応を取ること。
- ④ 港内係留中の小型船舶については、流出防止等の荒天準備を実施すること。
- ⑤ 必要に応じ勧告基準の見直しを行い、現状に即した基準とする。

### 4.3 津波注意報等発表時における対応について

#### (1) 勧告発出の根拠・基準

##### ① 発出根拠

港長は、異常な気象又は海象、海難の発生その他の事情により特定港内において船舶交通の危険を生ずるおそれがあると予想される場合において、必要があると認めるときは、特定港内又は特定港の境界付近にある船舶に対し、危険の防止の円滑な実施のために必要な措置を講ずべきことを勧告することができる。(港則法第 39 条第 4 項)

##### ② 発出基準

気象庁から津波注意報、津波警報、大津波警報又は南海トラフ地震臨時情報(巨大地震警戒)(巨大地震注意)が発表されたとき

#### (2) 勧告発出・解除の伝達方法

「鹿島港災害対策協議会台風等対策会議連絡系統図」に基づき、船舶代理店等を経由し

港内在泊船等に伝達する。

但し、設備障害等により、これによることができない場合が予想されることから、気象庁からの津波注意報、津波警報、大津波警報又は南海トラフ地震臨時情報（巨大地震警戒）（巨大地震注意）の発表をもって港長からの勧告が発出されたものとみなす。

### (3) 勧告発出時における対応

港内にある船舶の船長等は、津波注意報、津波警報、大津波警報発表時においては、津波到達までの時間、津波の高さ、自船の性能等を考慮し、「別表 1 津波に対する措置」（次ページ参照）の措置を講じるものとする。

南海トラフ地震臨時情報（巨大地震警戒）（巨大地震注意）発表時においては、「別表 1 南海トラフ地震臨時情報発表時の措置」（次ページ参照）を講じるものとする。

### (4) 勧告解除基準

発表されていた津波注意報、津波警報又は大津波警報が解除され、港内の安全が確認されたとき。

南海トラフ地震臨時情報（巨大地震警戒）（巨大地震注意）については、当該勧告発令から原則 1 週間程度が経過したとき。

### (5) その他留意事項等

- ① 代理店、バース管理者等は津波来襲までに時間的余裕が無い場合があるため、テレビ等を通じて自ら情報の収集に努めること。
  - ② 港外へ退避する場合は、原則として鹿島港南防波堤灯台から 8 海里以遠の水深 50m 以上の沖合水域に退避すること。
  - ③ 港外へ退避する船舶は、AIS を作動させ、直接又は船舶代理店等を通じ鹿島港長に通報するとともに国際 VHF、船舶電話等により港長との連絡手段を確保するものとする。
- なお、港長への通報については、状況に応じ行うこととし事後報告としても差支えない。
- ④ 本基準及び「鹿島港における船舶及び係留施設の津波対策に関する事項」については、予め船舶代理店等を通じ、広く取扱船舶等に対し周知するものとする。
  - ⑤ 必要に応じ勧告基準の見直しを行い、現状に即した基準とする。
  - ⑥ 津波警報、注意報の種類については、「津波予報の種類」（気象庁ホームページより）を参照のこと。

別表1

## 「津波に対する措置」

津波警報 注意報の分類			津波来襲までの時間的余裕	船舶の対応					
				港内着岸船			錨泊船 (工事作業船を含む)	航行船	
				大型船、中型船 (漁船を含む)		小型船		大型船 中型船 (漁船を含む)	小型船 (プレジャーボート 小型漁船等)
				危険物積載船	一般船舶 (荷役・作業船含む)	プレジャーボート 小型漁船等			
津波注意報	1m			荷役作業中止 係留避泊又は港外退避	荷役作業中止 係留避泊又は港外退避	陸揚げ固縛又は係留強化後の陸上避難 (場合によっては港外退避)	作業中止 港内避泊 (場合によっては港外退避)	原則 港外退避	着岸のうえ陸揚げ固縛、係留強化後の陸上避難 又は港外退避
津波警報	3m	高い	無し	荷役作業中止 係留避泊	荷役作業中止 係留避泊	陸上避難	作業中止 港内避泊	港外退避	着岸後陸上避難 又は港内避泊
			有り	荷役作業中止 港外退避	荷役作業中止 港外退避又は係留避泊	陸揚げ固縛又は係留強化後の陸上避難 (場合によっては港外退避)	作業中止 港外退避		着岸のうえ陸揚げ固縛若しくは係留強化後の陸上避難 又は港外退避
大津波警報	5m 10m 10m超	巨大	無し	荷役作業中止 係留避泊又は陸上避難	荷役作業中止 係留避泊又は陸上避難	陸上避難	作業中止 港内避泊	港外退避	着岸後陸上避難 又は港内避泊
			有り	荷役作業中止 港外退避	荷役作業中止 港外退避	陸揚げ固縛又は係留強化後の陸上避難 (場合によっては港外退避)	作業中止 港外退避		着岸のうえ陸揚げ固縛若しくは係留強化後の陸上避難 又は港外退避

## 「南海トラフ地震臨時情報発表時の措置」

南海トラフ地震臨時情報の種類	船舶の対応					
	港内着岸船			錨泊船 (工事作業船を含む)	航行船	
	大型船、中型船 (漁船を含む)		小型船		大型船 中型船 (漁船を含む)	小型船 (プレジャーボート 小型漁船等)
	危険物積載船	一般船舶 (荷役・作業船含む)	プレジャーボート 小型漁船等			
巨大地震警戒	荷役作業中止 原則港外退避	荷役作業中止 原則港外退避	陸揚げ固縛又は係留強化後の陸上避難 (場合によっては港外退避)	作業中止 港外退避	原則港外退避	着岸のうえ陸揚げ固縛 係留強化後の陸上避難 又は港外退避
巨大地震注意	南海トラフ地震に係る最新情報の入手と連絡体制の確保 後発地震発生に伴う津波警報等に備えた早期避難体制*の確保 小型船は係留強化 *・可能な限り出船着岸・必要に応じ直ちに出港できるよう準備・避難に必要な支援体制の確保 ・避難に必要な運航要員の確保・その他講じ得る体制の確保					

## 【用語の定義】

### 津波来襲までの時間的余裕

有り：大津波警報・津波警報が発せられた時点から避難に要する十分な時間（船舶を港外退避、陸揚げ固縛等の安全な状態に置くまで）がある場合

無し：大津波警報・津波警報が発せられた時点から避難に要する十分な時間（船舶を港外退避、陸揚げ固縛等の安全な状態に置くまで）が無い場合

※避難に要する十分な時間は、船の大きさ、船型等により異なるため、普段から自船の十分な時間を把握しておくこと。

大型船：タグボート等の補助、パイロットを必要とし単独で出港が困難な船舶をいう。

中型船：大型船及び小型船以外の船舶をいう。

小型船：プレジャーボート、漁船等のうち、港内において陸揚げできる程度の船舶（造船所での陸揚げは含まない）をいう。

陸上避難：船舶での退避は高い危険が予想されるので、乗組員等は陸上の高い場所に避難する。可能な限り船舶の流出防止、危険物の安全措置をとる。

港外退避：港外の水深が深く、十分広い海域、沖合いに避難する。（航行中に困難となった場合は、港内避泊。）

陸揚げ固縛：プレジャーボート、漁船等の小型船を陸揚げし、津波等により海上に流出しないよう固縛する。

港内避泊：港外避難船舶の航行に支障とならない海域での錨、機関、スラスターにより津波に対抗する。（小型船は流速の遅い水域で津波、漂流物を避航行。）

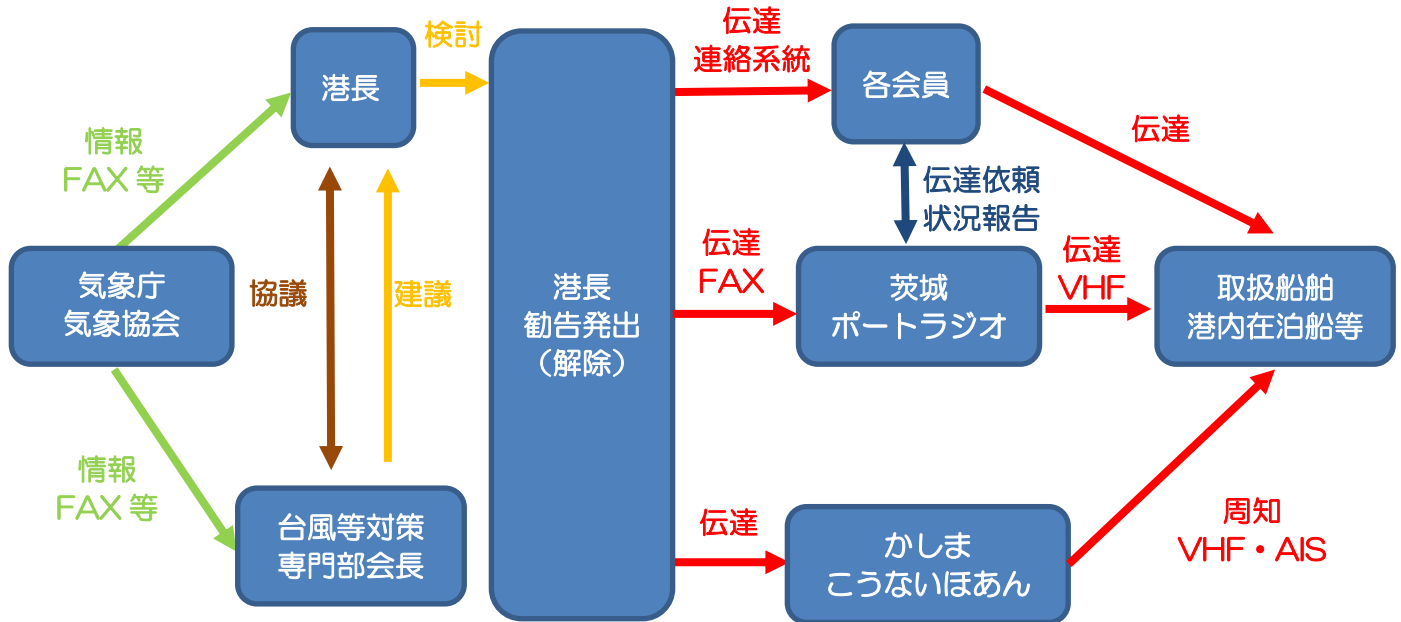
係留避泊：係留強化、機関の使用等により係留状態のまま津波に対抗する。（陸上作業員の緊急避難場所として乗船させることも考慮する。）

## 【注意事項】

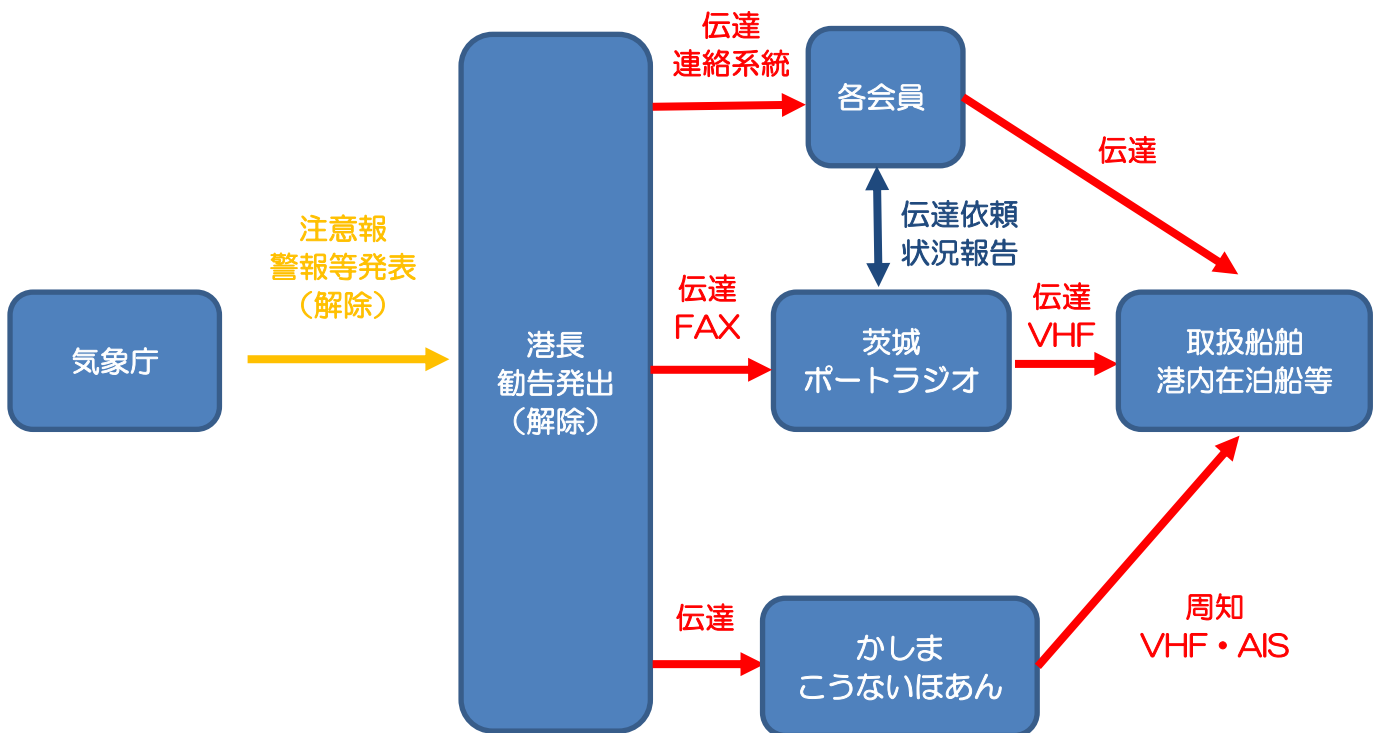
- 1 VHF 装備船は、常時VHFを聴取すること。（国際VHF 16ch）
- 2 AIS搭載船は、常時AISを作動させ、適正な入力を行うこと。
- 3 津波に関する情報等について、可能な限り入手に努めること。

## 4.2 勧告発出（解除）時における情報伝達系統

### (1) 台風・発達した低気圧接近の場合



### (2) 津波注意報・警報等発表（解除）の場合



## 5. 鹿島港運航調整自主ルール

### 運航停止（X信号に伴うもの）



#### 対象水路：中央水路

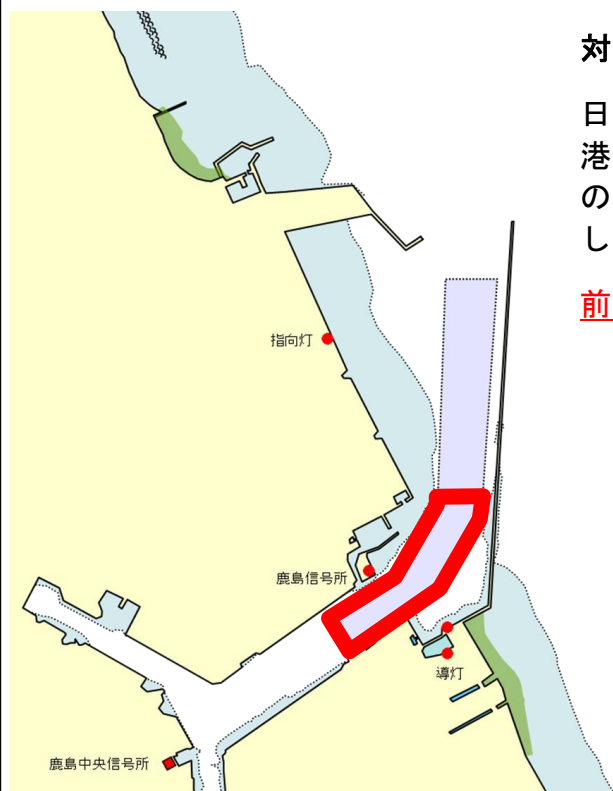
- ①鹿島石油原油栈橋1号（COP-1）・日本製鉄原料岸壁から全長330m以上の船舶が離岸し、鹿島水路内で回頭した後、出港態勢となるまでの間
- ②日本製鉄原料岸壁から全長330m以上の船舶が港内シフトのため離岸し鹿島水路内で回頭した後、再着岸態勢となるまでの間

前記期間は、左図赤枠内の海域に入域しない。  
また、北・南水路内の出港船は岸壁で待機する。

#### ※法律上の規定

X信号により、港長の指示を受けた船舶以外の船舶は、鹿島水路に入出航してはならない。

### 一方通航（特定の船舶の航行に伴うもの）



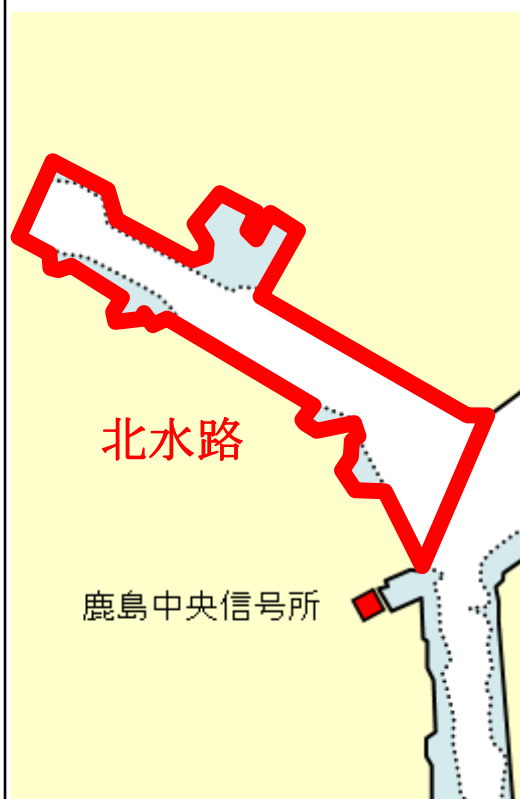
#### 対象水路：鹿島水路（屈曲部から南口までの間）

日本製鉄原料岸壁に、32万DWT以上の船舶が入港着岸、離岸出港またはシフトするため、鹿島水路の屈曲部（6号ブイ付近）から南口までの間を航行しているとき（管制信号は「I」または「O」）

前記期間は、左図赤枠内の海域を航行しない。



一方通航（特定の船舶の航行に伴うもの）



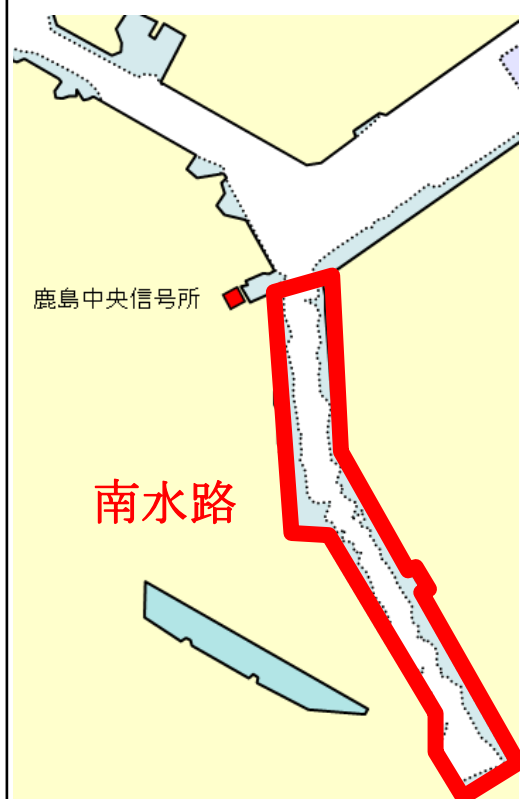
対象水路：北水路

- 昭和産業・全農サイロ・関東グレーンターミナル・日本製鉄の各社棧橋に、65,000DWT以上又は全長220メートル以上の船舶が入港着岸・離岸出港するため北水路内を航行している間
- 中国木材外航バースに、32,000DWT以上の船舶が入港着岸・離岸出港するため北水路内を航行している間
- 日本製鉄多目的岸壁に、総トン数13,000トン級（全長142m）以上のRORO船が後進着岸するため北水路内（小港湾入口前面）で回頭している間
- 北公共埠頭（付近泊地を含む。）に、全長70m以上の船舶（総トン数1,000トン未満を除く）が入港着岸・離岸出港するため、北水路の航路幅160mの暫定航路を航行している間

前記期間内は、左図赤枠外（北水路外）または岸壁で待機する。ただし、特定の船舶に支障を及ぼさない場合（※）は除く。

- ※例1 特定の船舶に続いて当該水路に入航し、特定船舶より中央水路に近い岸壁に着岸する場合
- ※例2 特定の船舶に先行して当該水路に入航し、特定船舶より当該水路奥の岸壁に着岸する場合
- ※例3 特定の船舶の係留場所より中央水路に近い岸壁に係留している船舶が、特定の船舶の通過後、離岸出港する場合

一方通航（特定の船舶の航行に伴うもの）



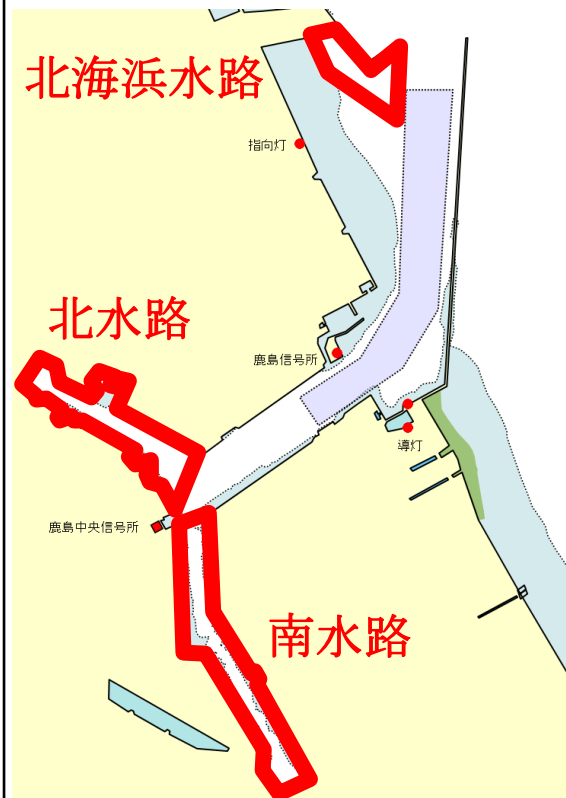
対象水路：南水路

- 南公共埠頭に、全長180m以上の船舶が入港着岸・離岸出港するため南水路内を航行している間
- 信越化学工業岸壁に、40,000DWT以上または全長180m以上の船舶が入港着岸するため南水路内を航行している間
- 信越化学工業岸壁・鹿島タンクターミナル棧橋から、全長125m以上の船舶が後進にて離岸出港するため南水路内を航行している間
- 花王岸壁から全長138.63m以上の船舶が離岸し、南公共埠頭G・H前面海域まで進出した後、回頭を終了するまでの間

前記期間内は、左図赤枠該（南水路外）または岸壁で待機する。ただし、特定の船舶に支障を及ぼさない場合（※）は除く。

- ※例1 特定の船舶に続いて当該水路に入航し、特定船舶より中央水路に近い岸壁に着岸する場合
- ※例2 特定の船舶に先行して当該水路に入航し、特定船舶より当該水路奥の岸壁に着岸する場合
- ※例3 特定の船舶の係留場所より中央水路に近い岸壁に係留している船舶が、特定の船舶の通過後、離岸出港する場合

## 行き会いの禁止



### 対象水路：北海浜水路

- 外港公共埠頭に入港着岸・離岸出港する船舶同士は行き会わない。

### 対象水路：北水路・南水路

- 全長70m以上（総トン数1,000トン未満の船舶を除く）の船舶同士は行き会わない。

## おわりに

鹿島港においては、平成18年10月、発達した低気圧の接近に伴い、3隻の大型鉾石運搬船が連続して座礁、また、平成23年3月の東日本大震災では、高さ5mを超える津波が来襲、いずれの災害も船舶や港湾機能に甚大な被害をもたらすものとなりました。

他方で、事故から得られた教訓を風化させず、これら異常気象時の事故防止対策を営々と築き上げ、今般、南海トラフ地震臨時情報発表時の対策が創設されたことで、鹿島港の更なる安全性の向上が期待されるところです。

しかしながら、これら安全対策はシステムとして構築されただけでは不完全であり、異常気象時において関係者がいかに適切な避難行動が取れるか、事前の検討・検証が重要となります。

このため、本手引きに鹿島港運航調整自主ルールに関する項目を新設し、内容を充実させることとしました。

関係者が実質的かつ適切な体制を構築するために本手引きが有効活用されることを期待し、また、鹿島港の安全と振興が両立することを祈念して、巻末のご挨拶とさせていただきます。

令和5年6月5日

鹿島海上保安署長・鹿島港長

鹿島港災害対策協議会 会長

**安達 裕司**

# **Kashima Port Vessel Navigation Safety Guide**

## **(3rd Edition)**

- 1. Conditions of marine accidents caused by bad weather**
- 2. Damage due to tsunami**
- 3. Sources of meteorological and marine information at Kashima Port**
- 4. Criteria for issuance of recommendations/information transmission systems**
- 5. Kashima Port rules for navigation and coordination**



June 2023

**Kashima Port Disaster Countermeasures Council**

## Introduction

In October 2006, the accident occurred in Kashima Port in which the ore carrier G (98,587 tons, registered in Panama), the cargo vessel O (88,853 tons, registered in Hong Kong), and the coal carrier E (85,350 tons, registered in Panama) ran aground due to bad weather. Based on this series of vessels running aground, a Local Liaison Meeting Based on Accidents Involving Vessels Running Aground in Kashima Port(\*) was established by local involved parties, and how to share information and measures to prevent future recurrences were examined. The Kashima Port Vessel Navigation Safety Guide (1st Edition) was compiled as a result.

Large ore carrier that ran aground



\* Members of the Kashima Port Local Liaison Meeting  
Kashima Port and Airport Construction Office, Kanto Regional Development Bureau  
Kashima Marine Office, Ibaraki Transportation Branch, Kanto Regional Development Bureau  
Kashima Coast Guard Station, Ibaraki Coast Guard  
Kashima Port Office, Ibaraki Prefecture  
Kashima Pilot Association  
Kashima Futo Co., Ltd.  
Kashima Port Vessel Agency Association  
Ibaraki Port Radio, TST Corp.

In addition, with the Great East Japan Earthquake that occurred on March 11, 2011, a large number of vessels, including those carrying dangerous goods, staying in the port were hit by the tsunami. Accidents occurred in which vessels drifted and collided with quays and other vessels due to the breaking of mooring lines, etc., causing extensive damage to vessels staying in the port, port facilities, and so on.

Based on this, the Kashima Port Disaster Countermeasures Council reviewed the guidelines for measures to be taken by vessels in the event of a tsunami, reconfirmed the evacuation procedure outside the port, and reconfirmed the recommended methods of communication. The Kashima Port Vessel Navigation Safety Guide (2nd Edition) was compiled as a result.

A large tanker that drifted and collided with other vessels



A cargo vessel that drifted and ran aground due to a tsunami



This guide summarizes the accident prevention measures to be implemented during such extreme weather events, as well as the safety measures to be implemented by vessels entering and leaving Kashima Port during normal times, in order to deepen the understanding of all parties using Kashima Port and enable them to implement more effective measures.

# 1. Conditions of marine accidents caused by bad weather

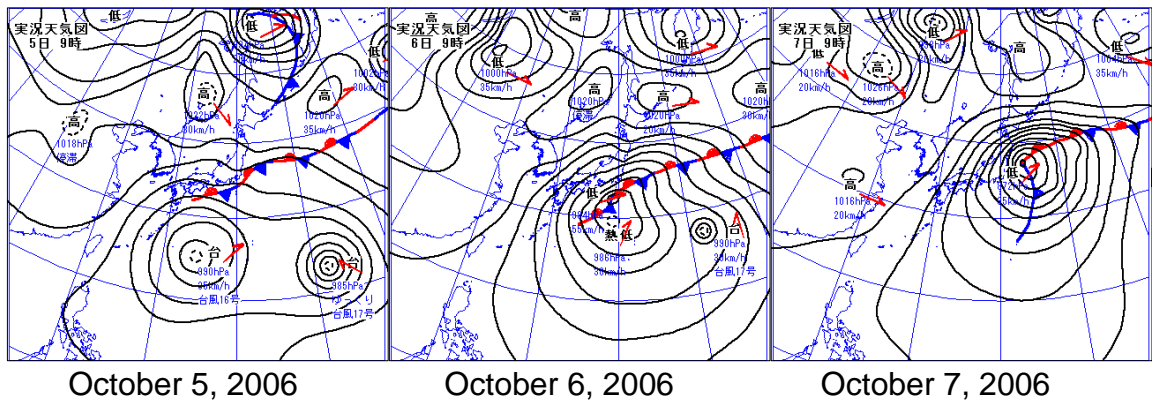
## 1.1 Past examples of marine accidents

NO	Type	Time/date of occurrence	Location	Vessel name, etc.	Summary
1	Collision	September 14, 1996 5:20 p.m.	In the port	Vessel V Registered in Saint Vincent & the Grenadines, 3986 t	The vessel left the quay at Kashima Port South Public Wharf A and started to sail toward the Kashima Port Central Fairway, but due to the strong winds from the east at that time, it became difficult to maintain the course, and the vessel collided with the berthing Y-Marun and K-Marun and was pushed against the revetment.
2	Grounding (dragging anchor)	1998 January 15 11:30 p.m.	In the port	Vessel S Registered in Belize, 1257 t	The vessel was anchored at an anchorage in the Kashima Port area awaiting permission to berth, and the vessel began dragging anchor due to a developed low pressure system.
3	Collision (dragging anchor)	1998 February 21 3:39 a.m.	Offshore	Vessel D Registered in China, 4462 t	While the vessel was anchoring off the Kashima Port South Breakwater Lighthouse to await berthing, it began dragging anchor due to deteriorating weather and collided with anchored vessel S (14,147 t).
4	Collision (dragging anchor)	1998 February 21 3:39 a.m.	Offshore	Vessel S Registered in Cyprus, 14,147 t	This vessel collided with Vessel D (4462 t), which was dragging anchor, while anchoring off the Kashima Port South Breakwater Lighthouse.
5	Grounding (dragging anchor)	1998 February 21 2:00 a.m.	In the port	Z-Marun Registered in Japan (Ehime Pref.), 497 t	This vessel was anchored off the Kashima Port North Breakwater Lighthouse to await berthing and began dragging anchor before running aground.
6	Grounding (dragging anchor)	1999 March 8 3:55 a.m.	In the port	M-Marun Registered in Japan (Ehime Pref.), 498 t	This vessel, after anchoring at the quarantine anchorage, moved to the North Shore to clean the hold. After that, strong winds and high waves from the northeast caused the vessel to drag anchor and run aground.
7	Grounding (dragging anchor)	2006 October 6 Evening	Offshore	Vessel G Registered in Panama, 98,587 t	The vessel was anchoring off Kashima Port but began heaving up anchor to evacuate offshore under strong winds. When doing so, the vessel began dragging anchor and it became impossible to heave up the anchor. It was not possible to slip anchor or steer the vessel and the vessel ran aground about 5 miles east of Kashima Port South Breakwater Lighthouse. After that, the hull was split into three parts—the bow, the hold, and the stern—by rough seas.
8	Grounding	2006 October 24 Past noon	In the port	Vessel O Registered in China, 88,853 t	The vessel entered Kashima Port and was loading and unloading, but when it was leaving the port to go offshore under strong winds to shelter from stormy weather, it collided with the end of the South Breakwater. After that, the vessel was pushed along the outer side of the breakwater and ran aground on the starboard side.
9	Grounding	2006 October 24 Night	In the port	Vessel E Registered in Panama, 85,350 t	The ship was in port at Kashima Port, but it began moving out to sea to shelter from stormy weather. Due to strong winds, it became difficult to navigate and the vessel was pushed, and it ran aground about 1 kilometer southwest of the end of the Kashima Port South Breakwater.

\* Marine accidents between 1996 and 2006

## 1.2 Pressure patterns

### <Marine Accident No. 7>



### <Marine Accident Nos. 8, 9>

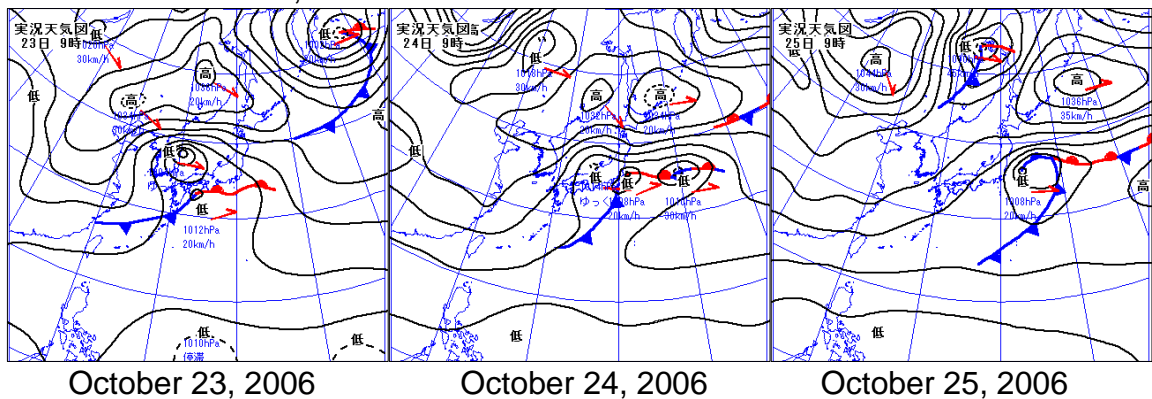


Fig. 2.1 Weather maps

### <Marine Accident No. 7>

Activity at the front, which had stagnated along the southern coast of Honshu, increased as the typhoon approached. In addition, a low-pressure system developed along a front off the coast of Shikoku developed rapidly along the southern coast of Honshu, and advanced further along the Sanriku coast and the eastern sea of Hokkaido.

### <Marine Accident Nos. 8, 9>

A low pressure system accompanied by a front passed over the southern coast of Honshu. The low pressure system did not develop much (the lowest central pressure was 1008 hPa), but the isobars were closely spaced with the high pressure system to the northeast of Hokkaido, and strong northerly winds continued to blow mainly along the coastal areas of the Kanto region. The low pressure system moved very slowly and strong winds continued for an extended period.

- When there is a dominant high pressure system on the north side of Japan and a low pressure system passes over the south end of Honshu, strong northeasterly winds often continue to blow near Kashima Port.
- At Kashima Port, where the port entrance faces northeast, the atmospheric pressure distribution requires attention.

### 1.3 Wind and wave conditions

Table 1.3.1 Observed values at Kashima Port

Factor		Marine Accident No. 7	Marine Accident Nos. 8, 9
Wind direction	(16directions)	N-NE	NW-N-NE
Max wind speed	(m/s)	14.1	15.8
Max significant wave	Height (m)	5.89	6.78
	Period (s)	13.3	11.7

- \* These are preliminary results. In addition, there are many examples of missing data in both cases, and there is a possibility that peak values have not been obtained.
- \* Max wind speed: Maximum observed average wind speed
- \* Max significant wave: Maximum significant wave observed
- \* Significant wave height and period: Average values of wave heights and periods of 1/3 of observed wave heights
- \* Wind direction and wind speed were observed at 10 m above ground on the Kashima Port Izumikawa Beach premises

### 1.4 Other factors contributing to the occurrence of marine accidents

The surface layer of the seabed along the coast of Kashima Port is comprised mostly of a sand and gravel layer formed by the effects of coastal currents and is not well-suited as an anchorage. Vessels frequently drag anchors during stormy weather.

### 1.5 Cases involving high waves

\* [1] The upper row shows the number of occurrences, and the lower row in parentheses ( ) shows the percentage of occurrences. [2] This is a statistical analysis of even numbers hours.

Number of observations	45620(96.1)
Number of missed observations	1864(3.9)

Table 2.1.1 Frequency table of wave height and period

January 1996–October 2006		Table 2.1.1 Frequency table of wave height and period															Total	Cumulative
Period (sec) Wave height (cm)	Less than 3.0 sec	3.0–4.0	4.0–5.0	5.0–6.0	6.0–7.0	7.0–8.0	8.0–9.0	9.0–10.0	10.0–11.0	11.0–12.0	12.0–13.0	13.0–14.0	14.0–15.0	15.0–16.0	16.0–17.0	17.0 sec or more		
901 cm or more																		
801–900																		
701–800							1 (0.0)										1 (0.0)	45620 (100.0)
651–700																		45619 (100.0)
601–650									4 (0.0)	1 (0.0)	4 (0.0)						9 (0.0)	45619 (100.0)
551–600							2 (0.0)		7 (0.0)	4 (0.0)	5 (0.0)	5 (0.0)	1 (0.0)				24 (0.1)	45610 (100.0)
501–550								8 (0.0)	15 (0.0)	7 (0.0)	17 (0.0)	2 (0.0)	1 (0.0)				50 (0.1)	45586 (99.9)
451–500						1 (0.0)	2 (0.0)	14 (0.0)	11 (0.0)	18 (0.0)	13 (0.0)	12 (0.0)	2 (0.0)	2 (0.0)			75 (0.2)	45536 (99.8)
401–450						3 (0.0)	17 (0.0)	15 (0.0)	14 (0.0)	18 (0.0)	39 (0.1)	20 (0.0)	14 (0.0)	4 (0.0)	3 (0.0)		147 (0.3)	45461 (99.7)
351–400					23 (0.1)	51 (0.1)	58 (0.1)	26 (0.1)	41 (0.1)	43 (0.1)	22 (0.0)	13 (0.0)	3 (0.0)	3 (0.0)			283 (0.6)	45314 (99.3)
301–350				8 (0.0)	115 (0.3)	103 (0.2)	100 (0.2)	59 (0.1)	95 (0.2)	80 (0.2)	29 (0.1)	8 (0.0)	5 (0.0)	1 (0.0)			603 (1.3)	45031 (98.7)
251–300			1 (0.0)	137 (0.3)	309 (0.7)	194 (0.4)	251 (0.6)	224 (0.5)	207 (0.5)	100 (0.2)	45 (0.1)	25 (0.1)	4 (0.0)	2 (0.0)	1 (0.0)		1500 (3.3)	44428 (97.4)
201–250			61 (0.1)	654 (1.4)	649 (1.4)	519 (1.1)	509 (1.1)	452 (1.0)	331 (0.7)	153 (0.3)	103 (0.2)	32 (0.1)	10 (0.0)	3 (0.0)			3476 (7.6)	42928 (94.1)
176–200		1 (0.0)	183 (0.4)	572 (1.3)	532 (1.2)	544 (1.2)	509 (1.1)	425 (0.9)	266 (0.6)	124 (0.3)	37 (0.1)	16 (0.0)	10 (0.0)	3 (0.0)	2 (0.0)		3224 (7.1)	39452 (86.5)
151–175		4 (0.0)	406 (0.9)	752 (1.6)	819 (1.8)	831 (1.8)	752 (1.6)	476 (1.0)	229 (0.5)	108 (0.2)	29 (0.1)	26 (0.1)	4 (0.0)	1 (0.0)	2 (0.0)		4439 (9.7)	36228 (79.4)
126–150		40 (0.1)	708 (1.6)	1041 (2.3)	1197 (2.6)	1166 (2.6)	869 (1.9)	439 (1.0)	271 (0.6)	103 (0.2)	41 (0.1)	13 (0.0)	2 (0.0)				5890 (12.9)	31789 (69.7)
101–125		150 (0.3)	987 (2.2)	1510 (3.3)	1786 (3.9)	1717 (3.8)	1020 (2.2)	478 (1.0)	242 (0.5)	87 (0.2)	24 (0.1)	3 (0.0)					8004 (17.5)	25899 (56.8)
76–100	1 (0.0)	213 (0.5)	899 (2.0)	1692 (3.7)	2248 (4.9)	2053 (4.5)	1144 (2.5)	418 (0.9)	156 (0.3)	41 (0.1)	10 (0.0)	2 (0.0)					8877 (19.5)	17895 (39.2)
51–75	12 (0.0)	184 (0.4)	658 (1.4)	1415 (3.1)	2140 (4.7)	1935 (4.2)	898 (2.0)	229 (0.5)	84 (0.2)	12 (0.0)	8 (0.0)	1 (0.0)					7576 (16.6)	9018 (19.8)
26–50	6 (0.0)	38 (0.1)	121 (0.3)	338 (0.7)	465 (1.0)	340 (0.7)	110 (0.2)	19 (0.0)	5 (0.0)								1442 (3.2)	1442 (3.2)
25 cm or less																		
Total	19 (0.0)	630 (1.4)	4024 (8.8)	8119 (17.8)	10287 (22.5)	9475 (20.8)	6257 (13.7)	3292 (7.2)	1978 (4.3)	926 (2.0)	391 (0.9)	157 (0.3)	44 (0.1)	16 (0.0)	5 (0.0)		45620 (100.0)	

Significant wave height of 4 m or more: 0.67% ≈ 2.4 times/year, Significant wave period of 10 s or more: 14.93% ≈ 54.5 times/year, Significant wave height of 4 m or more and significant wave period of 10 s or more: 0.53% ≈ 1.9 days/year

\* Significant wave height and period: Average values of wave heights and periods of 1/3 of observed wave heights



## 1.6 Cases involving strong winds

Marine Accident  
Nos. 8, 9

Marine  
Accident No. 7

Specified number of times	47484
Number of observations	45467
Number of missed observations	2017(4.2)

Origin: Kashima Period: January 1996–October 2006 Table 2.2.1 Wind direction/wind speed frequency table

Wind direction Wind speed (m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All directions	Cumulative
15.0 m/s or more	2 (0.0)	1 (0.0)	2 (0.0)	1 (0.0)	1 (0.0)	3 (0.0)	1 (0.0)	3 (0.0)	1 (0.0)	3 (0.0)						1 (0.0)	14 (0.0)	45467 (100.0)
14.0–15.0	2 (0.0)	1 (0.0)	6 (0.0)		1 (0.0)	3 (0.0)		1 (0.0)	2 (0.0)								16 (0.0)	45453 (100.0)
13.0–14.0	2 (0.0)	2 (0.0)	5 (0.0)	1 (0.0)		4 (0.0)		1 (0.0)	4 (0.0)	10 (0.0)	1 (0.0)	1 (0.0)			1 (0.0)		32 (0.1)	45437 (99.9)
12.0–13.0	4 (0.0)	4 (0.0)	9 (0.0)	6 (0.0)	4 (0.0)	1 (0.0)	2 (0.0)	1 (0.0)	9 (0.0)	6 (0.0)					1 (0.0)		47 (0.1)	45405 (99.9)
11.0–12.0	14 (0.0)	11 (0.0)	8 (0.0)	5 (0.0)	3 (0.0)	2 (0.0)		1 (0.0)	12 (0.0)	13 (0.0)					2 (0.0)	1 (0.0)	72 (0.2)	45358 (99.8)
10.0–11.0	15 (0.0)	16 (0.0)	33 (0.1)	12 (0.0)	6 (0.0)	11 (0.0)	2 (0.0)	3 (0.0)	17 (0.0)	43 (0.1)	4 (0.0)				5 (0.0)		167 (0.4)	45286 (99.6)
9.0–10.0	26 (0.1)	39 (0.1)	76 (0.2)	18 (0.0)	13 (0.0)	10 (0.0)	3 (0.0)	5 (0.0)	38 (0.1)	81 (0.2)	14 (0.0)		2 (0.0)	7 (0.0)	7 (0.0)		339 (0.7)	45119 (99.2)
8.0–9.0	40 (0.1)	115 (0.3)	204 (0.4)	59 (0.1)	21 (0.0)	20 (0.0)	7 (0.0)	10 (0.0)	70 (0.2)	160 (0.4)	40 (0.1)	3 (0.0)	4 (0.0)	17 (0.0)	18 (0.0)	10 (0.0)	798 (1.8)	44780 (98.5)
7.0–8.0	90 (0.2)	268 (0.6)	458 (1.0)	118 (0.3)	53 (0.1)	28 (0.1)	33 (0.1)	17 (0.0)	115 (0.3)	309 (0.7)	76 (0.2)	13 (0.0)	14 (0.0)	46 (0.1)	40 (0.1)	22 (0.0)	1700 (3.7)	43982 (96.7)
6.0–7.0	217 (0.5)	595 (1.3)	778 (1.7)	245 (0.5)	103 (0.2)	70 (0.2)	82 (0.2)	32 (0.1)	175 (0.4)	485 (1.1)	136 (0.3)	31 (0.1)	32 (0.1)	94 (0.2)	81 (0.2)	46 (0.1)	3202 (7.0)	42282 (93.0)
5.0–6.0	399 (0.9)	907 (2.0)	969 (2.1)	466 (1.0)	217 (0.5)	227 (0.5)	166 (0.4)	52 (0.1)	216 (0.5)	685 (1.5)	156 (0.3)	81 (0.2)	102 (0.2)	183 (0.4)	166 (0.4)	91 (0.2)	5083 (11.2)	39080 (86.0)
4.0–5.0	842 (1.9)	1204 (2.6)	1131 (2.5)	624 (1.4)	425 (0.9)	415 (0.9)	322 (0.7)	109 (0.2)	242 (0.5)	1003 (2.2)	177 (0.4)	155 (0.3)	222 (0.5)	345 (0.8)	580 (1.3)	236 (0.5)	8032 (17.7)	33997 (74.8)
3.0–4.0	1331 (2.9)	1285 (2.8)	1103 (2.4)	731 (1.6)	620 (1.4)	448 (1.0)	398 (0.9)	198 (0.4)	289 (0.6)	1536 (3.4)	229 (0.5)	202 (0.4)	355 (0.8)	452 (1.0)	1417 (3.1)	507 (1.1)	11101 (24.4)	25965 (57.1)
2.0–3.0	1217 (2.7)	882 (1.9)	809 (1.8)	564 (1.2)	640 (1.4)	392 (0.9)	389 (0.9)	243 (0.5)	245 (0.5)	1233 (2.7)	190 (0.4)	111 (0.2)	221 (0.5)	308 (0.7)	1483 (3.3)	772 (1.7)	9699 (21.3)	14864 (32.7)
1.0–2.0	486 (1.1)	417 (0.9)	405 (0.9)	329 (0.7)	371 (0.8)	324 (0.7)	246 (0.5)	165 (0.4)	238 (0.5)	238 (0.5)	71 (0.2)	21 (0.0)	46 (0.1)	113 (0.2)	440 (1.0)	430 (0.9)	4340 (9.5)	5165 (11.4)
Less than 1.0 m/s	64 (0.1)	55 (0.1)	67 (0.1)	70 (0.2)	85 (0.2)	67 (0.1)	67 (0.1)	67 (0.1)	71 (0.2)	49 (0.1)	20 (0.0)	8 (0.0)	10 (0.0)	25 (0.1)	53 (0.1)	47 (0.1)	825 (1.8)	825 (1.8)
Total	4751 (10.4)	5802 (12.8)	6061 (13.3)	3250 (7.1)	2562 (5.6)	2023 (4.4)	1720 (3.8)	906 (2.0)	1746 (3.8)	5851 (12.9)	1114 (2.5)	626 (1.4)	1008 (2.2)	1590 (3.5)	4294 (9.4)	2163 (4.8)	45467 (100.0)	

\* [1] The upper row shows the number of occurrences, and the lower row in parentheses ( ) shows the percentage of occurrences. [2] This is a statistical analysis of even numbers hours. [3] Wind direction and wind speed were observed at 10 m above ground on the Kashima Port Izumikawa Beach premises

Wind direction N–NE and wind speeds of 10 m/s or more 0.3% ≈ 1.0 day/year

## 1.7 Cases in which both wind and waves are particularly strong

Looking at the data from the past 35 years (1972–2006), the weather and sea conditions that caused marine accidents Nos. 8 and 9 were exceeded only once.

Subject period (Date and Time–Date and Time)				Max significant wave height (m)	Max significant wave period (sec)	Most frequent wave direction (16 primary directions)	Max wind speed (m/s)					
1975	11	10	6	-	1975	11	13	18	7.09	14.8	-	13.7
1980	10	3	6	-	1980	10	5	18	6.52	14.9	-	10.6
1980	11	26	12	-	1980	12	3	10	7.06	13.7	-	11.7
1980	12	23	20	-	1980	12	27	4	6.32	13.4	-	12.1
1986	3	23	4	-	1986	3	25	22	6.67	12.7	-	20.2
1992	11	7	10	-	1992	11	9	22	6.69	12.7	ENE	14.7
1993	3	8	0	-	1993	3	10	22	6.70	13.8	NE	11.8
2001	1	26	4	-	2001	1	28	20	7.33	12.3	ENE	14.8
2005	1	15	14	-	2005	1	18	16	6.21	13.5	NE	12.7
2006	10	23	12	-	2006	10	26	12	6.47	12.0	ENE	15.8

\* [1] The values for 2006 are preliminary values. [2] Wind direction and wind speed were observed at 10 m above ground on the Kashima Port Izumikawa Beach premises

Extraction conditions 1. Max significant wave height 6 m or more and  
2. Max significant wave period 12 sec or more and  
3. Max wind speed 10 m/s or more

- \* Max significant wave: Maximum significant wave observed
- \* Significant wave height and period: Average values of wave heights and periods of 1/3 of observed wave heights
- \* Max wind speed: Maximum observed average wind speed

## 2. Damage due to tsunami

### 2.1 Great East Japan Earthquake (Source: Japan Meteorological Agency (JMA) materials)

Occurred at 2:46 p.m. on Friday, March 11, 2011

Magnitude 9.0

Maximum seismic intensity 7 (maximum seismic intensity 6 lower in Kashima, maximum seismic intensity 6 lower in Kamisu)

The first wave struck Kashima Port around 3:32 p.m.

Max tsunami wave around 4:40 p.m., height: 5.7 m

### 2.2 Major damage to vessels (based on a study by the Kashima Coast Guard)

No.	Vessel type	Gross tonnage	Summary
1	Cargo vessel	499 tons	Mooring lines were broken by the tsunami. The vessel drifted, collided with other vessels, and became unable to navigate.
2	Tanker	160,066 tons	Mooring lines were broken by the tsunami. The vessel drifted and collided with other vessels but was able to leave the port on its own.
3	Tanker	47,027 tons	Mooring lines were broken by the tsunami. The vessel drifted and collided with the quay. Although the engine room was found to be flooded, the crew members conducted repairs and the vessel evacuated from the port on its own.
4	Tanker	5,998 tons	The vessel collided with the quay due to the tsunami and began to drift due to the breaking of the mooring line. After that, the crew of the ship boarded the ship, found the engine room flooded, and judged that it was impossible to navigate the vessel on its own. With the support of a tugboat, the vessel berthed at the North Public Wharf D.
5	Cargo vessel	499 tons	Mooring lines were broken by the tsunami. The vessel drifted and ran aground in the port. After that, the crew of the ship was transferred via tugboat, and after the vessel was refloated, they evacuated from the port.
6	Cargo vessel	22,089 tons	Mooring lines were broken by the tsunami. The vessel drifted and collided with other vessels but was able to leave the port on its own.
7	Cargo vessel	106,333 tons	Mooring lines were broken by the tsunami. While drifting, the vessel's anchor chain became entangled with other vessels' anchor chains, and the engine room was flooded. After that, the vessel left the port with the support of a tugboat.
8	Cargo vessel	91,178 tons	Mooring lines were broken by the tsunami. The vessel drifted and ran aground in front of the TEPCO water intake. The cargo was removed where it ran aground and the vessel was refloated.
9	Cargo vessel	27,989 tons	Mooring lines were broken by the tsunami. The vessel dropped anchor on both sides, but the starboard anchor chain broke and the vessel collided with the quay. After that, the vessel left the port on its own.
10	Cargo vessel	36,008 tons	Mooring lines were broken by the tsunami. Although the vessel drifted, it was possible to navigate on its own and docked at the quay.
11	Cargo vessel	14,286 tons	Mooring lines were broken by the tsunami. Although the vessel drifted and collided with the quay, it anchored in the South Fairway. After that, the vessel left the port on its own.
12	Cargo vessel	25,448 tons	Mooring lines were broken by the tsunami. Although the vessel drifted, it left the port on its own.

### 3. Sources of meteorological and marine information at Kashima Port

(1) NOWPHAS : Nationwide Ocean Wave information network for Ports and Harbors

URL <https://www.mlit.go.jp/kowan/nowphas/>

(2) Ibaraki Coast Guard Office

[1] Maritime Information and Communication System

Computer <https://www6.kaiho.mlit.go.jp/03kanku/ibaraki/>

Cellular phone <https://www6.kaiho.mlit.go.jp/m/03kankuibaraki/>

Smartphone <https://www6.kaiho.mlit.go.jp/sp/>

[2] Telephone service 029-264-0177

(3) Mito Meteorological Office website

URL <https://www.jma-net.go.jp/mito/>

(4) Other

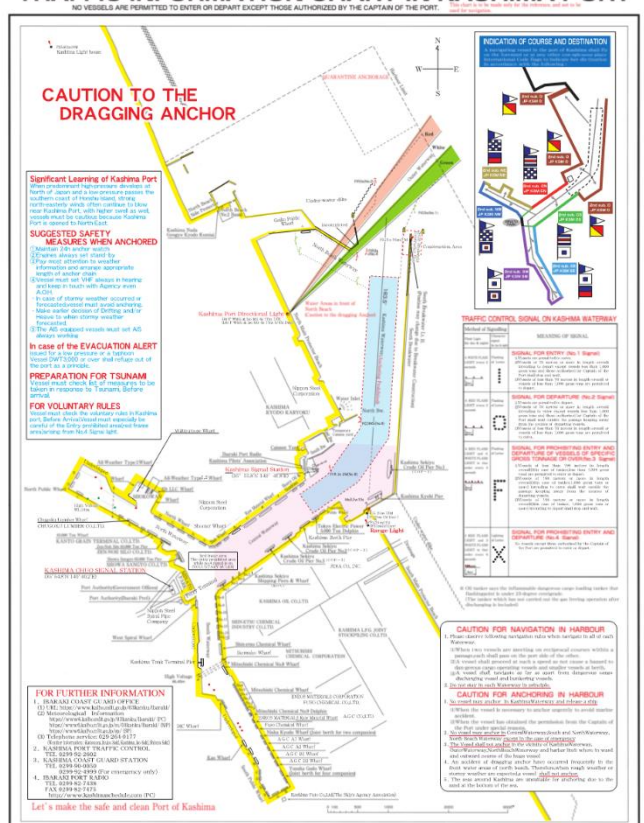
Traffic Information Chart in Kashima Port

Japanese version

鹿島港情報図

English version

TRAFFIC INFORMATION CHART IN KASHIMA PORT



鹿島海上保安署監修

海上保安協会鹿島支部  
鹿島港船舶代理店協会

2022年12月

EDITED BY KASHIMA COAST GUARD STATION

COAST GUARD ASSOCIATION, KASHIMA BRANCH  
THE SHIP'S AGENCY ASSOCIATION OF KASHIMA PORT  
KASHIMA PORT DISASTER COUNCIL

2022 DEC.

\* **The Traffic Information Chart in Kashima Port is available at the harbormaster's office.  
It can also be accessed on the Ibaraki Coast Guard website.**

## 4. Criteria for issuance of recommendations/information transmission systems

(Established on June 5, 2023 by the Kashima Port Disaster Countermeasures Council)

### 4.1 Response to approaching typhoons

#### (1) Basis and criteria for issuance of recommendations

##### [1] Basis for issuance

In cases where it is expected that there is a risk of danger to vessel traffic in the specified port due to abnormal weather or sea conditions, occurrence of a marine accident, or other circumstances, the harbormaster may, when they determine if necessary, recommend that vessels in the specified port or near the boundary of the specified port take necessary measures for the smooth implementation of measures aimed at preventing danger. (Article 39, Paragraph 4 of the Act on Port Regulations)

##### [2] Criteria for issuance

Recommendations shall be made when the port is expected to fall within the strong wind zone of a typhoon. The types and timing of recommendations are as follows:

- First Warning System (Preparation System)—9 hours before the port is expected to fall within a strong wind zone
- Second Warning System (Evacuation Advisory)—6 hours before the port is expected to fall within a strong wind zone

#### (2) Method of issuance and cancellation of recommendations

Transmitted to vessels staying in the port via shipping agencies, etc., based on the Kashima Port Disaster Countermeasures Council Typhoon Countermeasure Committee Communication System.

#### (3) Response at the time of issuance of recommendations

First Warning System (Preparation System)	<ul style="list-style-type: none"> <li>• Vessels in port shall be prepared for stormy weather and ready for immediate operation if necessary.</li> <li>• Loading and unloading of dangerous goods and port construction work, etc. shall be suspended in principle.</li> <li>• Measures shall be taken to prevent the outflow of construction materials and equipment, etc.</li> <li>• Owners of small vessels and managers of mooring facilities for small vessels shall take measures to prevent unloading and spillage.</li> <li>• AIS shall be turned on at all times on AIS-equipped vessels.</li> <li>• Vessels equipped with international VHF marine radios shall listen to Channel 16 at all times.</li> <li>• Agencies, etc. with a vessel destined for Kashima Port shall communicate with the vessel and coordinate evacuation to another port, etc.</li> </ul>
Second Warning System (Evacuation Advisory)	<ul style="list-style-type: none"> <li>• As a general rule, vessels of 3,000 DWT or more should evacuate outside the port.</li> <li>• Anchoring vessels of 3,000 DWT or more shall heave up anchor quickly and drift and evacuate to safe waters.</li> <li>• Anchoring vessels of 3,000 DWT or less shall coordinate with their agency and be moored at the quay or evacuated to another port.</li> <li>• Vessels mooring and sheltering in the port should take measures such as preparing engines and checking their mooring periodically.</li> </ul>

(4) Criteria for cancelling recommendations

If any of the following apply and safety in the port is confirmed, the harbormaster and the committee chair shall discuss and cancel the recommendations.

[1] When the port no longer falls within the strong wind zone

[2] The port still falls within the strong wind zone, but the weather conditions do not meet the recommended criteria due to the approach of a developed low pressure system, and it is clear that the weather will recover.

(5) Other notes

[1] By implementing the standard, the Typhoon Countermeasure Council can be omitted in principle.

[2] If the recommendation time for the warning system is at night (approximately 17:00 to 9:00 the following morning), the warning shall be issued by 16:00 whenever possible.

[3] Vessels staying in port shall secure means of communication with their agency, etc. and pay attention to information from the harbormaster.

[4] Vessels staying in port should not be captive of the timing of the issuance of recommendations by the harbormaster but should take appropriate measures according to individual circumstances, such as preparing for stormy weather and evacuating from the port early.

[5] Even if this port does not fall within a strong wind zone, if the evacuation advisory criteria value for an approaching low pressure system is reached, the evacuation advisory criteria for approaching low pressure systems shall be applied.

[6] Review the recommendation criteria as necessary to make the criteria consistent with the current situation.

[7] The timing of the issuance of this recommendation is based on the data from the Expert Committee on Typhoon Countermeasures of the Kashima Port Disaster Countermeasures Council in June 2004. (\*Attached data omitted)

4.2 Response to approaching low pressure systems

(1) Basis and criteria for issuance of recommendations

[1] Basis for issuance

In cases where it is expected that there is a risk of danger to vessel traffic in the specified port due to abnormal weather or sea conditions, occurrence of a marine accident, or other circumstances, the harbormaster may, when they determine if necessary, recommend that vessels in the specified port or near the boundary of the specified port take necessary measures for the smooth implementation of measures aimed at preventing danger. (Article 39, Paragraph 4 of the Act on Port Regulations)

[2] Criteria for issuance

Based on weather forecasts for Kashima Port provided by the JWA, when all of the following conditions are expected to be met, in principle, a recommendation shall be made no later than 24 hours before said weather.

Wave direction	North to east (0–120°)
Wave height (significant wave height)	4 meters or more
Wind speed (average wind speed)	10 m/s or more

Notwithstanding the above criteria, when the harbormaster and the chair of the committee deem it necessary upon consultation, the same recommendation shall be made.

(2) Method of issuance and cancellation of recommendations

Transmitted to vessels staying in the port via shipping agencies, based on the Kashima Port Disaster Countermeasures Council Typhoon Countermeasure Committee Communication System.

(3) Response at the time of issuance of recommendations

<p>Vessels of 3,000 DWT or more (Vessels subject to evacuation)</p>	<ul style="list-style-type: none"> <li>• As a general rule, a moored vessel shall drift and evacuate to a safe area of sea outside the port.</li> <li>• Vessels anchoring near Kashima Port shall heave up anchor quickly and drift and evacuate to safe waters.</li> <li>• AIS shall be turned on at all times on AIS-equipped vessels.</li> <li>• Vessels equipped with international VHF marine radios shall listen to Channel 16 at all times.</li> </ul>
<p>Vessels of under 3,000 DWT (Vessels other than those subject to evacuation)</p>	<ul style="list-style-type: none"> <li>• Vessels anchoring in or near Kashima Port shall coordinate with their agency and be moored at the quay or evacuated to another port.</li> <li>• AIS shall be turned on at all times on AIS-equipped vessels.</li> <li>• Vessels equipped with international VHF marine radios shall listen to Channel 16 at all times.</li> <li>• Vessels mooring and sheltering in the port should take measures such as preparing engines and checking their mooring periodically.</li> </ul>

(4) Criteria for cancelling recommendations

When the average wind speed is less than 10 m/s and safety in the port is confirmed, the harbormaster and the committee chair shall discuss and cancel the recommendations.

(5) Other notes

- [1] The order of priority for evacuation is determined by the harbormaster (controller), the pilot, and the tow operator upon coordination.
- [2] Agencies, etc. with a vessel destined for Kashima Port shall communicate with the vessel and coordinate evacuation to another port, etc.
- [3] Vessels staying in port should not be captive of the timing of the issuance of recommendations by the harbormaster but should take appropriate measures according to individual circumstances, such as preparing for stormy weather and evacuating from the port early.
- [4] Small vessels moored in the port shall take measures to prevent drifting such as preparing for stormy weather.
- [5] Review the recommendation criteria as necessary to make the criteria consistent with the current situation.

4.3 Responding after the issuance of a tsunami advisory

(1) Basis and criteria for issuance of recommendations

[1] Basis for issuance

In cases where it is expected that there is a risk of danger to vessel traffic in the specified port due to abnormal weather or sea conditions, occurrence of a marine accident, or other circumstances, the harbormaster may, when they determine if necessary, recommend that vessels in the specified port or near the boundary of the specified port take necessary measures for the smooth implementation of measures aimed at preventing danger. (Article 39, Paragraph 4 of the Act on Port Regulations)

[2] Criteria for issuance

When the JMA issues a tsunami advisory, tsunami warning, major tsunami warning, or Nankai Trough Earthquake Extra Information (Megathrust Earthquake Alert) (Megathrust Earthquake Attention).

(2) Method of issuance and cancellation of recommendations

Transmitted to vessels staying in the port via shipping agencies, etc., based on the Kashima Port Disaster Countermeasures Council Typhoon Countermeasure Committee Communication System.

However, because it is expected that this may not be possible due to equipment failure, etc., it is deemed that recommendations from the harbormaster be regarded as issued with the announcement of a tsunami advisory, tsunami warning, major tsunami warning, or Nankai Trough Earthquake Extra Information (Megathrust Earthquake Alert) (Megathrust Earthquake Attention) by the JMA.

(3) Response at the time of issuance of recommendations

When a tsunami advisory, tsunami warning, or major tsunami warning is issued, the captain of a vessel in the port shall take the measures described in Appended Table 1: Measures to Take in Response to Tsunamis (see the next page) in consideration of the time until the tsunami is to arrive, the height of the tsunami, and the performance of their ship.

When Nankai Trough Earthquake Extra Information (Megathrust Earthquake Alert) (Megathrust Earthquake Attention) is issued, they shall take the measures described in Appended Table 1: Measures to Take in Response to issued Nankai Trough Earthquake Extra information (see the next page).

(4) Criteria for cancelling recommendations

When the issued tsunami advisory, tsunami warning, or major tsunami warning is cancelled and safety in the port is confirmed.

With regard to Nankai Trough Earthquake Extra Information (Megathrust Earthquake Alert) (Megathrust Earthquake Attention), when approximately one week has passed in principle from the issuance of the recommendation.

(5) Other notes

[1] Agencies, berth managers, etc. may not have ample time before a tsunami strikes, so they should make efforts to collect information on their own through TV, etc.

[2] When evacuating outside the port, in principle, evacuate to offshore waters with a depth of 50 m or more, eight nautical miles or more from the Kashima Port South Breakwater Lighthouse.

[3] Vessels evacuating outside the port shall turn on their AIS and notify the Kashima Port harbormaster directly or through a ship agency, etc., and shall secure a means of communication with the harbormaster through international VHF, ship telephone, etc.

Notification to the harbormaster shall be made in accordance with the situation and may be made as a post-report.

[4] These criteria and matters concerning tsunami countermeasures for ships and mooring facilities at Kashima Port shall be widely communicated to vessels handled, etc. through shipping agencies, etc. in advance.

[5] Review the recommendation criteria as necessary to make the criteria consistent with the current situation.

[6] For tsunami warnings and advisories, refer to Types of Tsunami Forecasts (from the JMA website).

Appendix Table 1

## Measures to be Taken in Response to Tsunami

Categories of Tsunami Prediction			Time Available Before Arrival of Tsunami	Measures to be Taken by Vessels						
				Large Vessels and Medium Vessels (including Fishing Boats)				Anchoring Vessels (including Working Vessels)	Proceeding Vessels	Small Vessels (Pleasure Boats, Fishing Boats, etc)
				In a port Berthing Vessels		Vessels Carrying Dangerous Cargo	General Vessels (including Vessels for Loading/Unloading and Other Operations)			
Tsunami Advisory	1 meter	/	/	Suspend loading/Unloading or Operation Berthing Sheltering or Offshore Evacuation	Suspend loading/Unloading or Operation Berthing Sheltering or Offshore Evacuation			Suspend Operation In a port Sheltering (Offshore Sheltering, if necessary)	Offshore Evacuation (default)	
Tsunami Warning	3 meters	High	No	Suspend loading,/Unloading or Operations Sheltering at Berth	Suspend loading,/Unloading or Operations Sheltering at Berth	Suspend Operation In a port Sheltering	Offshore Evacuation	(Skipped)		
			Yes	Suspend loading,/Unloading or Operations Offshore Evacuation	Suspend loading,/Unloading or Operations Offshore Evacuation or Berthing Sheltering	Suspend Operation Offshore Evacuation				
Large Tsunami Warning	5 meters, 10 meters, 10 meters or higher	Huge	No	Suspend loading,/Unloading or Operations Berthing Sheltering or On -terrene Evacuation	Suspend loading,/Unloading or Operations Berthing Sheltering or Evacuation on Terrene	Suspend Operation In a port Sheltering	Offshore Evacuation			
			Yes	Suspend loading,/Unloading or Operations Offshore Evacuation	Suspend loading,/Unloading or Operations Offshore Evacuation	Suspend Operation Offshore Evacuation				

**Measures to be taken in Response to The Nankai Trough Earthquake Extra information  
When Tsunami Warning or Advisory is issued, priority is given to "Measures to be taken in response to Tsunami"**

Categories of Nankai Trough Earthquake Extra Information	Measures to be Taken by Vessels				
	Large Vessels and Medium Vessels (including Fishing Boats)				Small Vessels (Pleasure Boats, Fishing Boats, etc)
	In a port Berthing Vessels		Anchoring Vessels (including Working Vessels)	Proceeding Vessels	
Megathrust Earthquake Alert	Suspend loading,/Unloading or Operations Principle Offshore Evacuation				Suspend Operations Offshore Evacuation
Megathrust Earthquake Attention	<ul style="list-style-type: none"> <li>Obtaining the latest information on the Nankai Trough earthquake from Japan Meteorological Agency and securing good communications</li> <li>Securing "early evacuation methods in preparation for expected tsunami warnings following subsequent earthquakes.</li> <li>For small vessels extra moorings ready</li> </ul> NB. "early evacuation methods" : Berthing head out as much as possible Readiness to depart immediately when necessary. Securing necessary support for evacuation Securing sufficient crew for evacuation Considering additional measures to be taken				(Skipped)



[Terms and Definitions]

Time Allowance to Tsunami Strike:

**Yes:** Vessels may have sufficient time to evacuate (to put the vessel in a safe state by offshore evacuation or landing and binding) following the release of a major tsunami warning/tsunami warning

**No:** Vessels will not have sufficient time to make evacuation (to put the vessel in a safe state by offshore evacuation or landing and binding) following the release of a major tsunami warning/tsunami warning

**Large-sized Vessels:** Vessels unable to make self-leaving off the port without the assistance of support boats (tugboats, etc.) and/or pilot service

**Mid-sized Vessels:** Other Vessels than Large Vessels or Small Vessels

**Small Vessels:** pleasure/fishing boats: They are small enough to be carried onto land and sheltered (excluding docking)

**On-Terrene Evacuation:** Crew members take refuge on terrene in high places, as high risk is predicted for in-vessel sheltering before leaving the vessel, complete securing-vessel-measures where possible, such as securing dangerous cargo and ensuring protection from vessel being swept away

**Offshore Evacuation:** Choose a wide area where water is deep and away from the coast (if face a difficulties in evacuation, re-choose in a port sheltering.)

**In a port Sheltering:** Sheltering in the emergency sheltering areas inside the port and resisting tsunami water power by means of anchors or using engines/thrusters

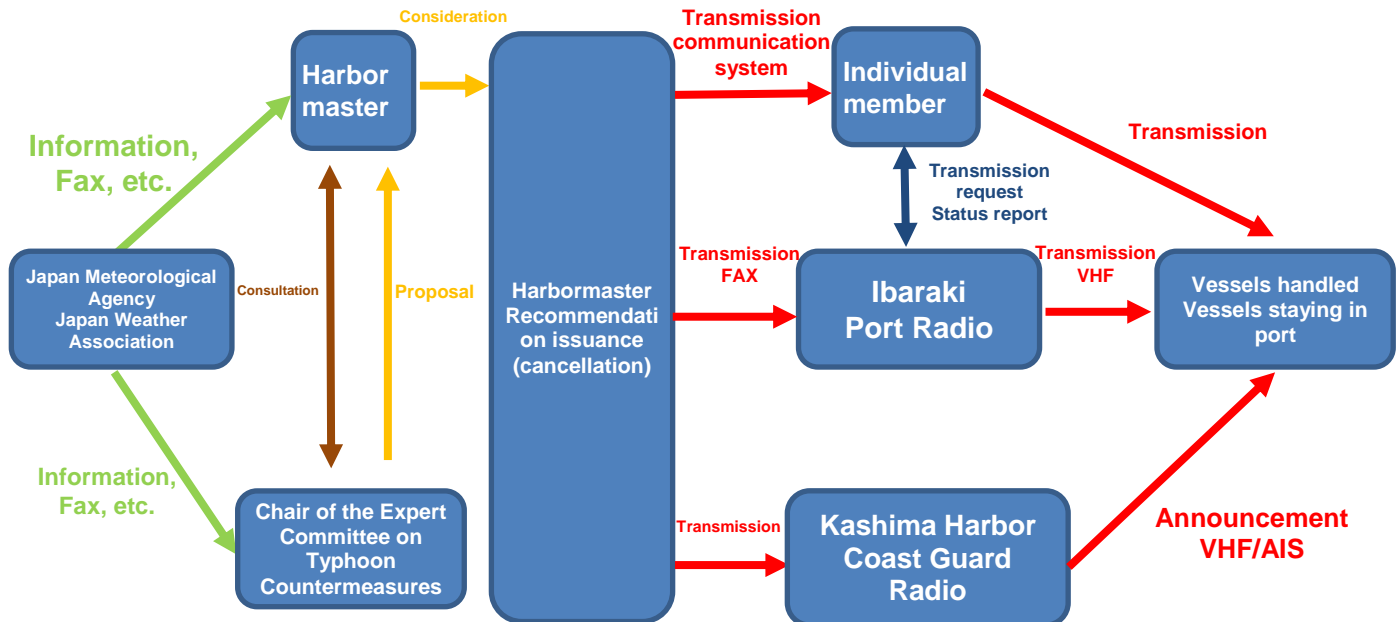
**Mooring Sheltering:** Resisting tsunami power while berthing by means of enhancement of berthing force or through the use of engines (Acceptance of land workers seeking emergency shelters onboard should be considered.)

[Precautions]

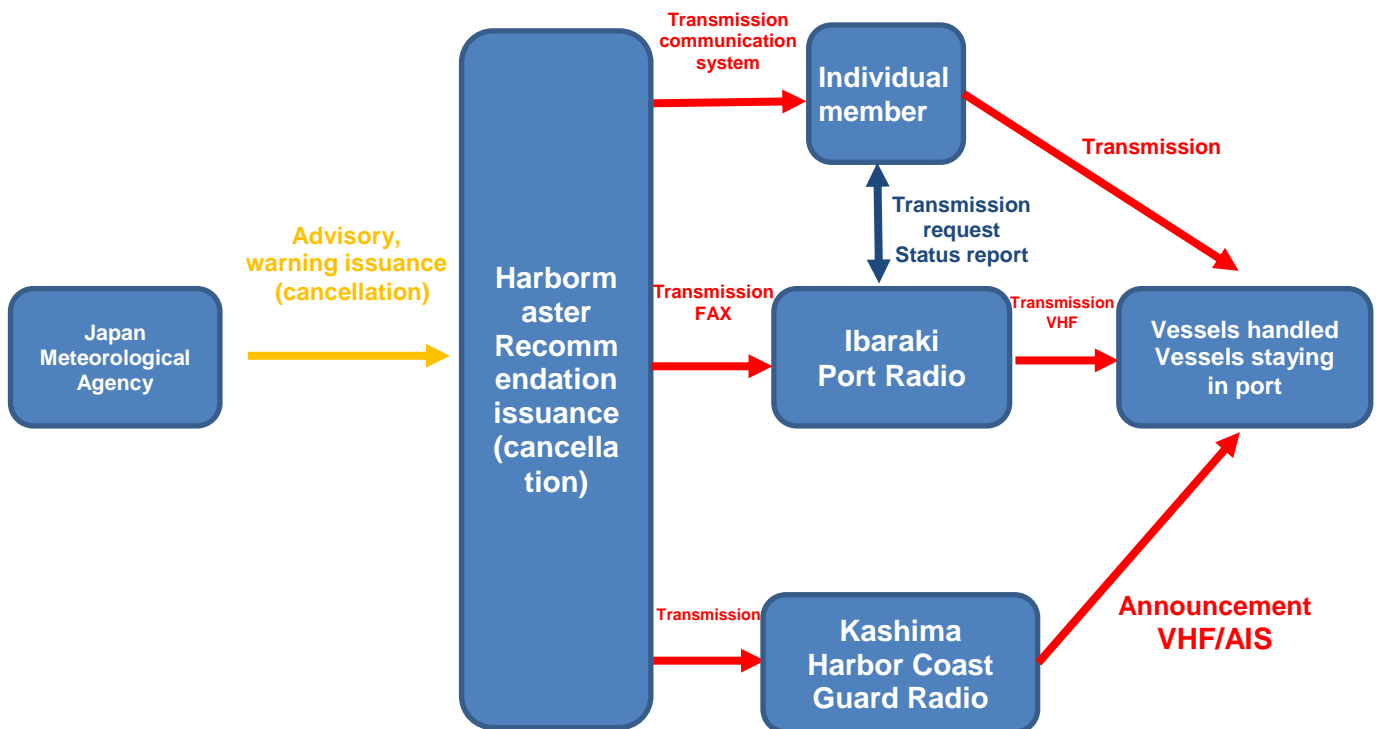
1. Vessels with VHF equipment should constantly monitor VHF channels (International VHF Channel 16).
2. Vessels with AIS equipment should keep the AIS equipment operated, and make appropriate input.
3. Efforts should be made to gather any available information on the tsunami.

## 4.2 Communication system at the time of issuance (cancellation) of recommendations

(1) In the case of an approaching low pressure system or typhoon

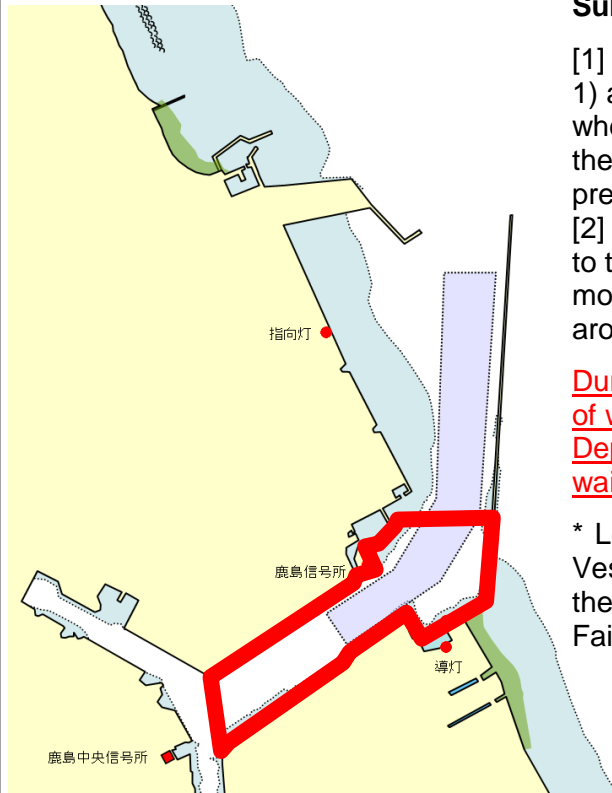


(2) In case of announcement (cancellation) of tsunami warning/advisory, etc.



## 5. Kashima Port rules for navigation and coordination

### Suspension of operations (due to X signal)



#### Subject fairway: Central Fairway

[1] The interval from Kashima Crude Oil Pier No. 1 (COP-1) and the Nippon Steel raw material wharf to the point when a vessel with a length overall of 330 m or more leaves the quay, turns around in the Kashima Fairway, and prepares to leave the port

[2] The interval from the Nippon Steel raw material wharf to the point when a vessel with a length overall of 330 m or more leaves the quay to shift in the port, and after turning around in the Kashima Fairway, and prepares to dock again

During the above interval, vessels shall not enter the area of water outlined in red on the left.

Departing vessels in the North and South Fairways shall wait at the quay.

#### \* Legal provisions

Vessels other than those instructed by the harbormaster via the X signal shall not enter or depart from the Kashima Fairway.

### One-way operation (accompanying the navigation of specific vessels)



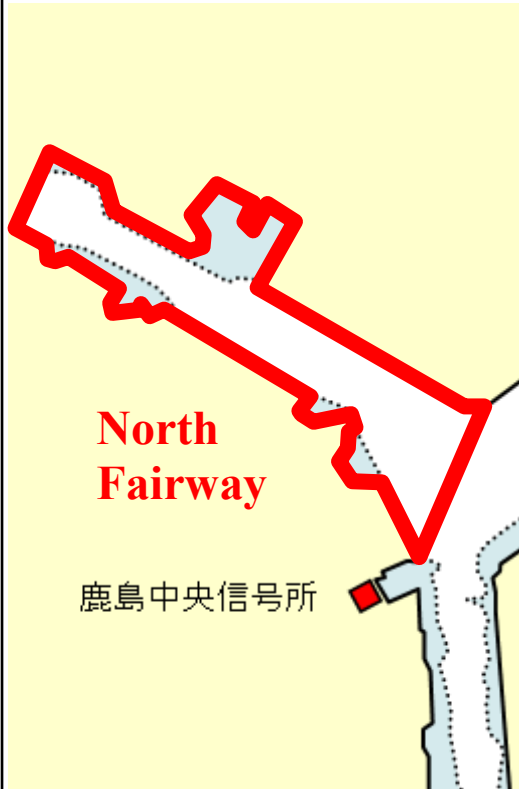
#### Subject fairway: Kashima Fairway (interval between the bend and the South Entrance)

When a vessel of 320,000 DWT or more enters, leaves, or shifts from the Nippon Steel raw material wharf, and is navigating between the bend (near Buoy No. 6) and the South Entrance of the Kashima Fairway (control signal "I" or "O")

During the above interval, vessels shall not operate in the area of water outlined in red on the left.

## One-way operation (accompanying the navigation of specific vessels)

### Subject fairway: North Fairway



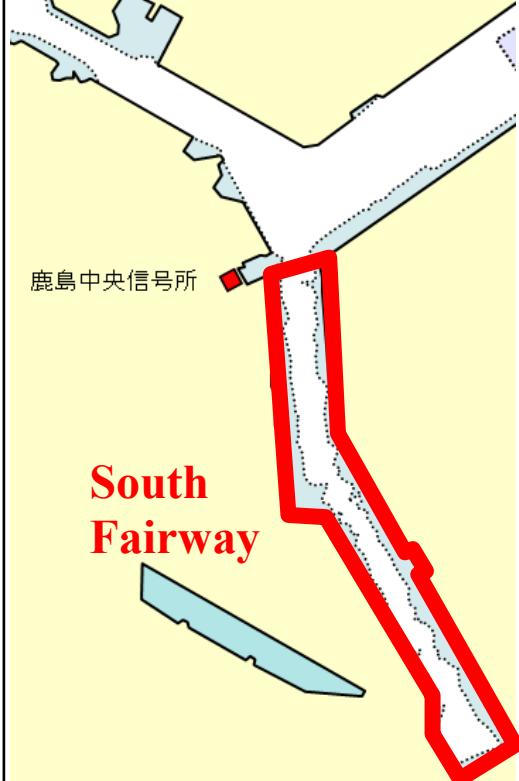
- The interval when a vessel of 65,000 DWT or more and 220 m or more in length overall is operating in the North Fairway in order to dock or depart from a quay at the Showa Sangyo, Zenno Silo, Kanto Grain Terminal, or Nippon Steel piers
- The interval when a vessel of 32,000 DWT or more is operating in the North Fairway in order to enter and dock at or depart from the Chugoku Mokuzai outgoing berth
- The interval when a RORO vessel with a gross tonnage of 13,000 tons (142 m in length overall) or more is turning around in the North Fairway (in front of the Small Port Entrance) in order to dock astern at the Nippon Steel multi-purpose quay
- The interval when a vessel with a length overall of 70 m or more (excluding vessels with a gross tonnage of less than 1,000 tons) is operating on a temporary course with a course width of 160 m in the North Fairway in order to dock at or depart from the North Public Wharf (including nearby anchorages)

During the above intervals, vessels shall wait outside the area outlined in red (outside the North Fairway) or at the quay. However, that this shall not apply in cases (\*) that do not interfere with a specific vessel.

- \* Example 1 In the case of entering the fairway following a specific vessel and berthing at a quay closer to the Central Fairway than the specific vessel
- \* Example 2 In the case of entering the fairway before the specific vessel and berthing at a quay further down the fairway from the specific vessel
- \* Example 3 In the case when a vessel moored at a quay closer to the Central Fairway than the mooring of the specific vessel departs from quay after the specific vessel passes by

## One-way operation (accompanying the navigation of specific vessels)

### Subject fairway: South Fairway

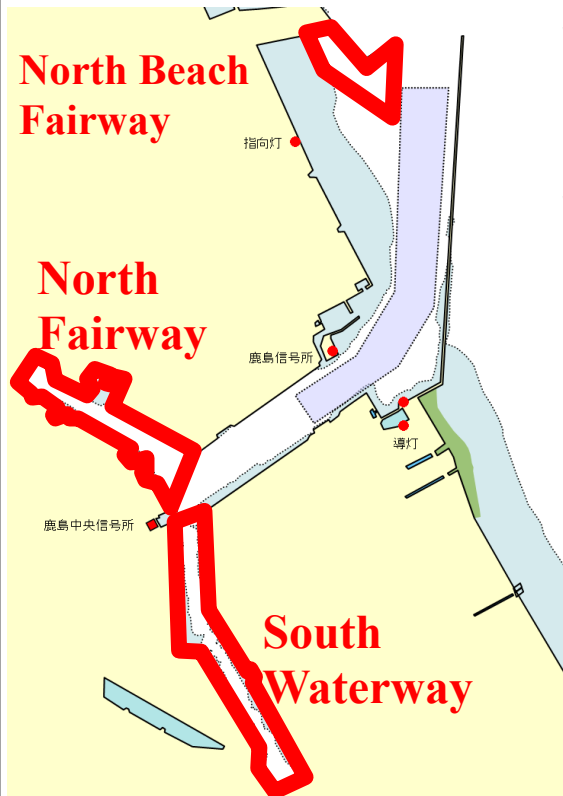


- The interval when a vessel with a length overall of 180 m or more is operating in the South Fairway in order to enter and dock at or depart from the South Public Wharf
- The interval when a vessel of 40,000 DWT or more or a length overall of 180 m or more is operating in the South Fairway to enter and dock at the Shin-Etsu Chemical quay
- The interval when a vessel with a length overall of 125 m or more is operating in reverse in the South Fairway to leave the Shin-Etsu Chemical quay or Kashima Tank Terminal pier
- The interval when a vessel with a length overall of 138.63 m or more leaves the Kao quay and travels to the area in front of South Public Wharf G/H before completing the turn

During the above intervals, vessels shall wait outside the area outlined in red (outside the South Fairway) or at the quay. However, that this shall not apply in cases (\*) that do not interfere with a specific vessel.

- \* Example 1 In the case of entering the fairway following a specific vessel and berthing at a quay closer to the Central Fairway than the specific vessel
- \* Example 2 In the case of entering the fairway before the specific vessel and berthing at a quay further down the fairway from the specific vessel
- \* Example 3 In the case when a vessel moored at a quay closer to the Central Fairway than the mooring of the specific vessel departs from quay after the specific vessel passes by

## Prohibition of navigating in opposite directions



### Subject fairway: North Beach Fairway

- Vessels entering and leaving the public wharfs in the outer port shall not navigate in opposite directions.

### Subject fairways: North & South Fairways

- Vessels with a length overall of 70 m or more (excluding those with a gross tonnage of less than 1,000 tons) shall not navigate in opposite directions.

## **Conclusion**

**In October 2006, three large ore carriers ran aground in Kashima Port due to the approach of a developed low pressure system. And in March 2011, the Great East Japan Earthquake triggered a tsunami with a height exceeding 5 m. Both disasters caused severe damage to vessels and port functions.**

**At the same time, the lessons learned from these accidents have not been forgotten. Measures to prevent accidents during such abnormal weather events have been steadily built up. With the recent establishment of measures in the case of issued Nankai Trough Earthquake Extra information, further improvements in the safety of Kashima Port are expected.**

**However, these safety measures, as a system alone, are incomplete, and it is important that the involved parties examine and verify in advance how appropriate evacuation actions can be taken in the event of abnormal weather.**

**For this reason, we have decided to enhance the contents of this guide by adding a new section on the Kashima Port rules for navigation and coordination.**

**I would like to conclude by expressing my hope that this guide is used effectively by the involved parties to build substantial and appropriate systems, and that the safety and promotion of Kashima Port are encouraged in a balanced manner.**

**June 5, 2023**

**Yuji Adachi**

**Chair of the Kashima Port Disaster Countermeasures Council  
Kashima Port Harbormaster, Chief of the Kashima Coast Guard Station**