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P&I Loss Prevention Bulletin

The Japan Ship Owners Mutual Protection & Indemnity Association
Loss Prevention and Ship Inspection Department

Preventing Damage to Harbour Facilities and Ship Handling in Harbours

PART 1

INDEX

1. Introduction

In 6 years between February 20th, 2007 and February 20th, 2013, a total of 1,743 claims for damage to harbour facilities were made by ocean-going vessels entered in this Association. Of these claims, nearly 70% were for damage to piers (835 claims, 48%) and 20% for damage to fenders (357 claims).

Most damage to harbour facilities is due to mistakes in the handling of vessels by ship navigators such as captains and pilots. The risk of damage is particularly high when approaching piers under rapidly changing weather conditions, and it is therefore extremely difficult to eliminate such incidents completely.

However, after the pilot has boarded the vessel upon entering or leaving harbour, damage to harbour facilities can be reduced by close cooperation between the captain and pilot on ship handling procedure rather than leaving everything to the pilot. It is also important to ensure that the bridge crew understand these procedures, as required by Bridge Resource Management (BRM). Furthermore, it is always important to investigate conditions in the harbour beforehand.

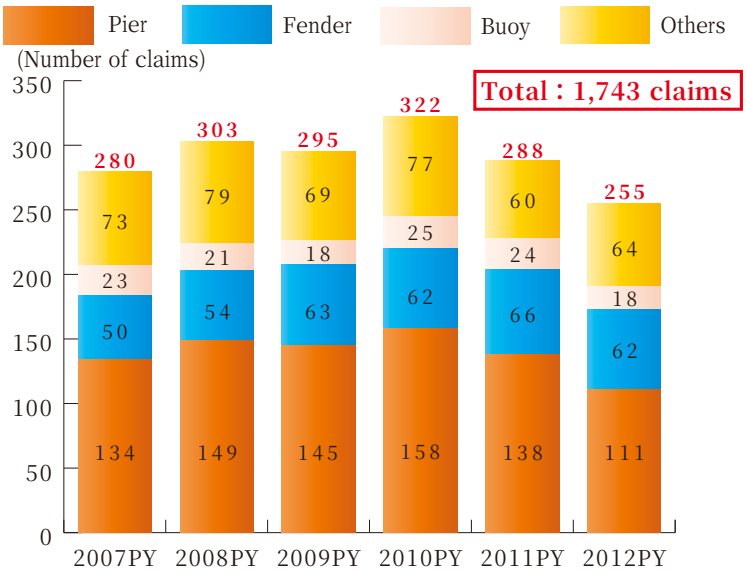
In PART1, we introduce claim statistics and causes of accidents, and in PART2, we will set out what matters must be understood by the navigator on board, including conditions within the harbour, and the performance of the ship.

2. Claim Statistics (ocean-going vessels)

2-1 Number of Claims for Damage to Harbour Facilities, and Trends in Insurance Money

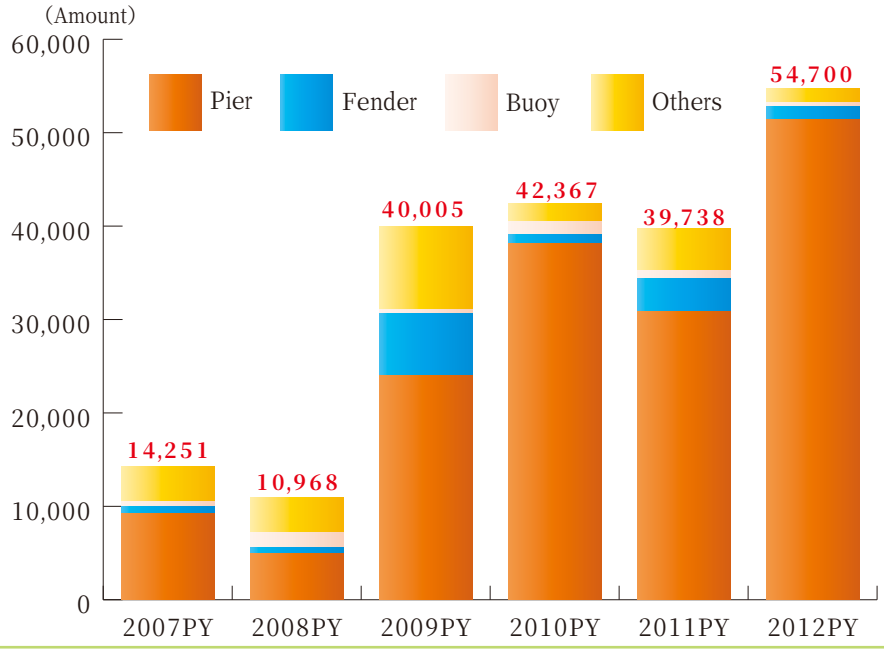
Claims for damage to harbour facilities have decreased gradually from the peak of 322 in 2010PY. Using the number of entered vessels at the beginning of each PY as the denominator, the rate of occurrence of claims is approximately 10%. In other words, approximately 10% of vessels are responsible for incidents involving damage to harbour facilities.

Trends in Number of Claims for Damage to Port Facilities
Contact with Pier/Port Facilitiy etc..



Insurance claims pay-outs amounted to approximately $11 million in 2008PY, increasing by a factor of three in 2009PY, 2010PY, and 2011PY, with a sharp increase to $55 million in 2012PY. This large increase is attributed to major incidents in 2009PY and later, and in particular to one incident in 2012PY (approximately $43 million, 78% of the total).

Trends in Insurance Money for Damage to Port Facilities
Claim Amount(USD 1,000)



2-2 Analysis of Claims by Amount

Over the six-year period, 133 claims (8%) required an insurance pay out of $100 thousand or more, while, insurance claims amounted to approximately $186 million (92%). Furthermore, nine claims exceeded $5 million in 2009PY and later, accounting for 55% of the total claims paid over the six-year period, and resulting in a large increase in claims paid (including estimates) in 2009PY and later. In 2012PY, as described above, a single incident accounted for 78% of the insurance claims paid for that year.

Claims by Amount

55%

USD 1,000

Insurance money band	2007PY		2008PY		2009PY		2010PY		2011PY		2012PY		Total			
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Ratio	Amount	Ratio
Over US$ 10mil.					1	13,350	1	13,545			1	42,812	3	0.2%	69,707	34.5%
US$ 5mil. < US$ 10mil.					2	11,745	2	13,978	2	16,235			6	0.3%	41,958	20.8%
US$ 1mil. < US$ 5mil.	3	5,652	3	4,517	2	5,827	2	5,722	6	15,576	1	4,209	17	1.0%	41,504	20.5%
US$ 100 thou. < US$ 1mil.	17	6,307	14	3,758	20	6,251	22	6,288	17	4,978	17	5,701	107	6.1%	33,283	16.5%
More than US$ 100 thou. S.Total	20	11,959	17	8,275	25	37,173	27	39,534	25	36,789	19	52,722	133	7.6%	186,452	92.3%
US$ 10 thou. < US$ 100 thou.	58	1,680	74	2,009	68	2,284	64	2,186	66	2,480	49	1,555	379	21.7%	12,194	6.0%
Less than US$ 10 thou.	202	612	212	683	202	548	231	646	197	469	187	424	1,231	70.6%	3,382	1.7%
Less than US$ 100 thou. S.Total	260	2,292	286	2,692	270	2,832	295	2,832	263	2,949	236	1,979	1,610	92.4%	15,576	7.7%
Total	280	14,251	303	10,968	295	40,005	322	42,367	288	39,738	255	54,700	1,743	100.0%	202,028	100.0%

2-3 Large Claims of $5 million Or More (nine claims)

① In April 2009, upon leaving the pier and departing the harbour at a port in the Middle East, a vessel was caught by strong winds while turning with the assistance of two tugs. The stern approached the pier on the port side, contacting and damaging a gantry crane. A claim was made for the repair costs of the crane and for losses due to the crane being out of action. The incident was due to a mistake in handling the vessel by the pilot.

② In August 2009, while underway in the Yangtze River in China, a steering problem developed in the vicinity of a port, and the vessel contacted a floating crane. While the steering problem was the immediate cause of the incident, the vessel's speed of 16.5 knots in the narrow waterway exacerbated the problem.

③ In December 2009, a ship in ballast was leaving a Japanese container terminal with the assistance of two tugs. It was caught by strong winds after leaving the pier and contacted the breakwater, resulting in damage. The external plating of the ship's hull was holed, resulting in a leakage of 0.8 kiloliters of fuel oil. The oil reached the tetrapods in the area, penetrating into their interiors. Two years of work was required to remove the oil from the tetrapods. The incident was due to a mistake in handling the vessel by the pilot.

④ In February 2010, in Chile, a chip loading pier and a shore loader were damaged while a vessel was approaching the pier.

⑤ In November 2010, while maneuvering with the assistance of a tug during approach to the pier at a container terminal in Japan, a vessel contacted a gantry crane at excessive speed, generating major loss of earnings and repair costs claims.

⑥ In October 2010, while approaching the pier with the assistance of two tugs at an oil terminal in Japan, a mistake was made in attitude control of the vessel, and her stern contacted a mooring dolphin on the port side. The collision resulted in a fuel tank on the vessel being holed, with leakage of 46 kiloliters of fuel, and generating major costs for repair of the dolphin, cleanup of the spilled oil, and compensation to fishermen.

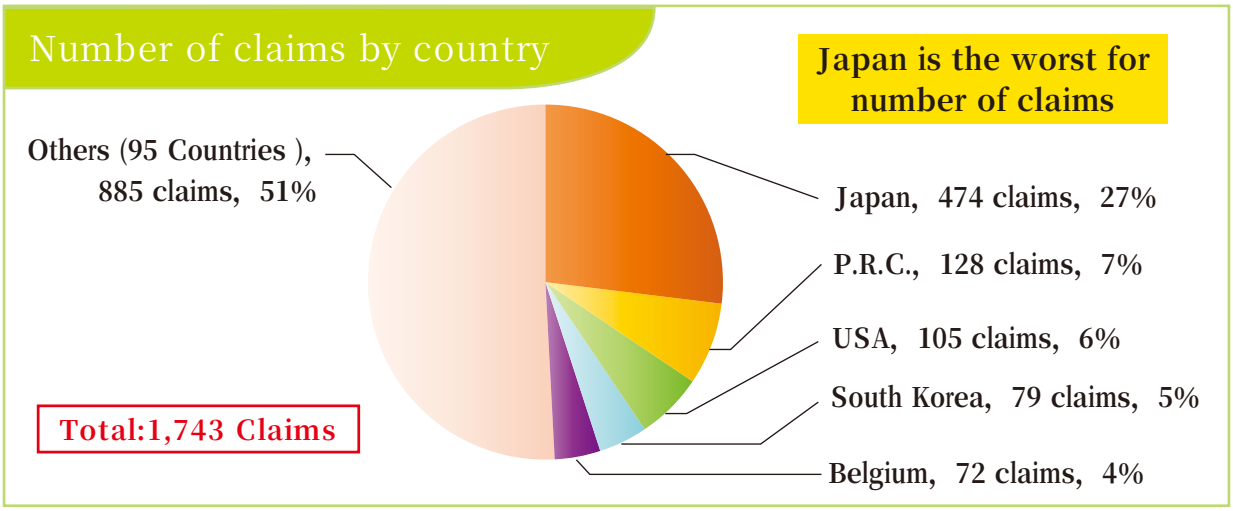
⑦ In November 2011, while leaving a river port in North America and proceeding towards the sea, a steering fault developed, resulting in the vessel contacting the pier and a barge. While the steering fault was the immediate cause of the incident, mistaken shutdown of the steering unit by one of the crew also contributed to the incident.

⑧ In September 2011, while at anchor outside a port in Japan, a vessel dragged her anchor due to strong winds associated with a typhoon, contacting the breakwater and grounding, and resulting in a total loss.

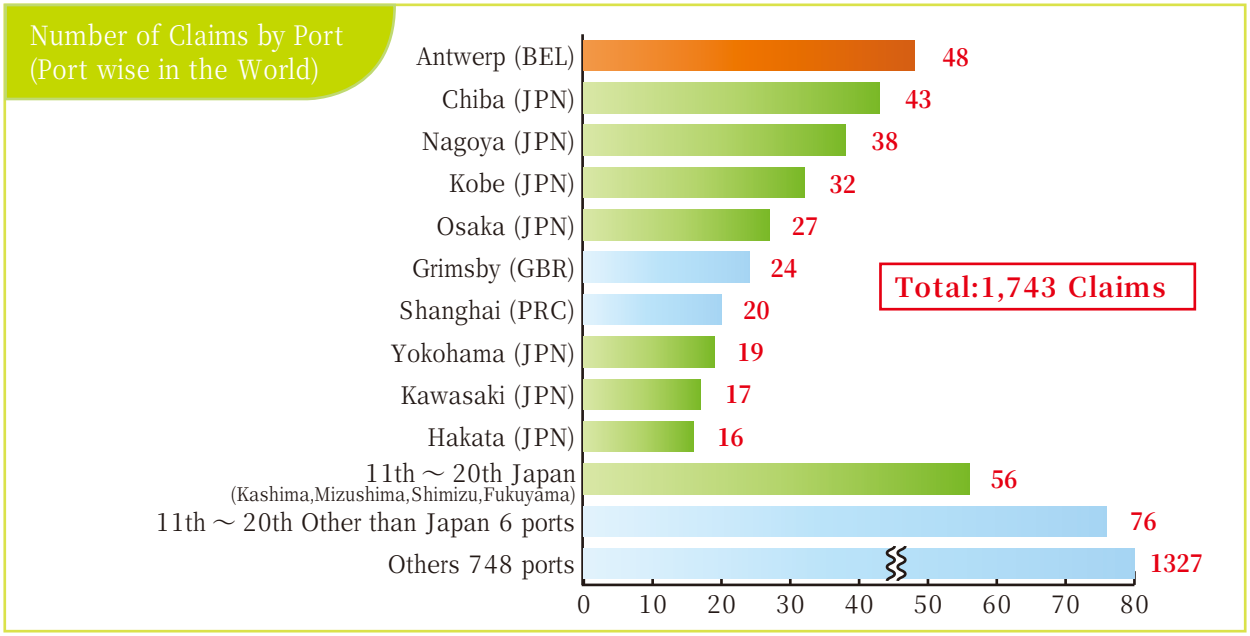
⑨ In December 2012, at a port on the west coast of North America, a mistake was made in approaching the pier, resulting in major damage to a coal berth.

2-4 Claims by Country

An analysis of claims during the six years by country shows that Japan (474 claims, 27%) was significantly worse than China, the US, and South Korea in that order.

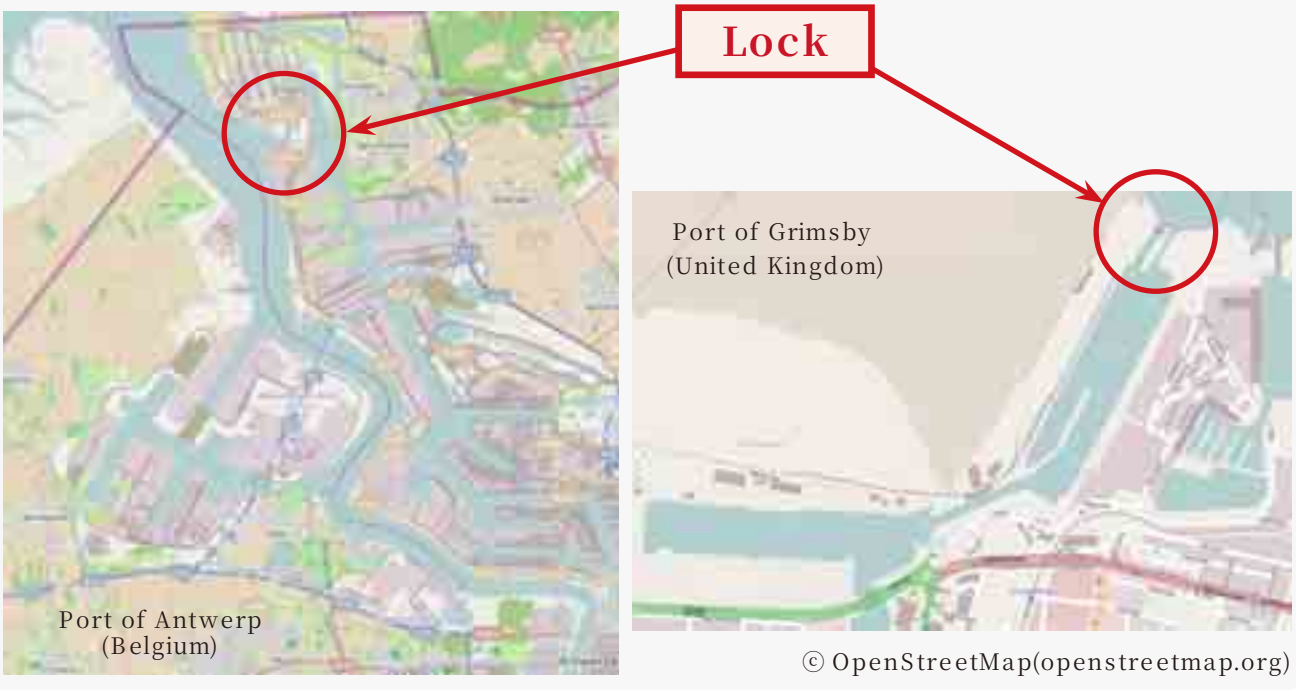


2-5 Claims by Port



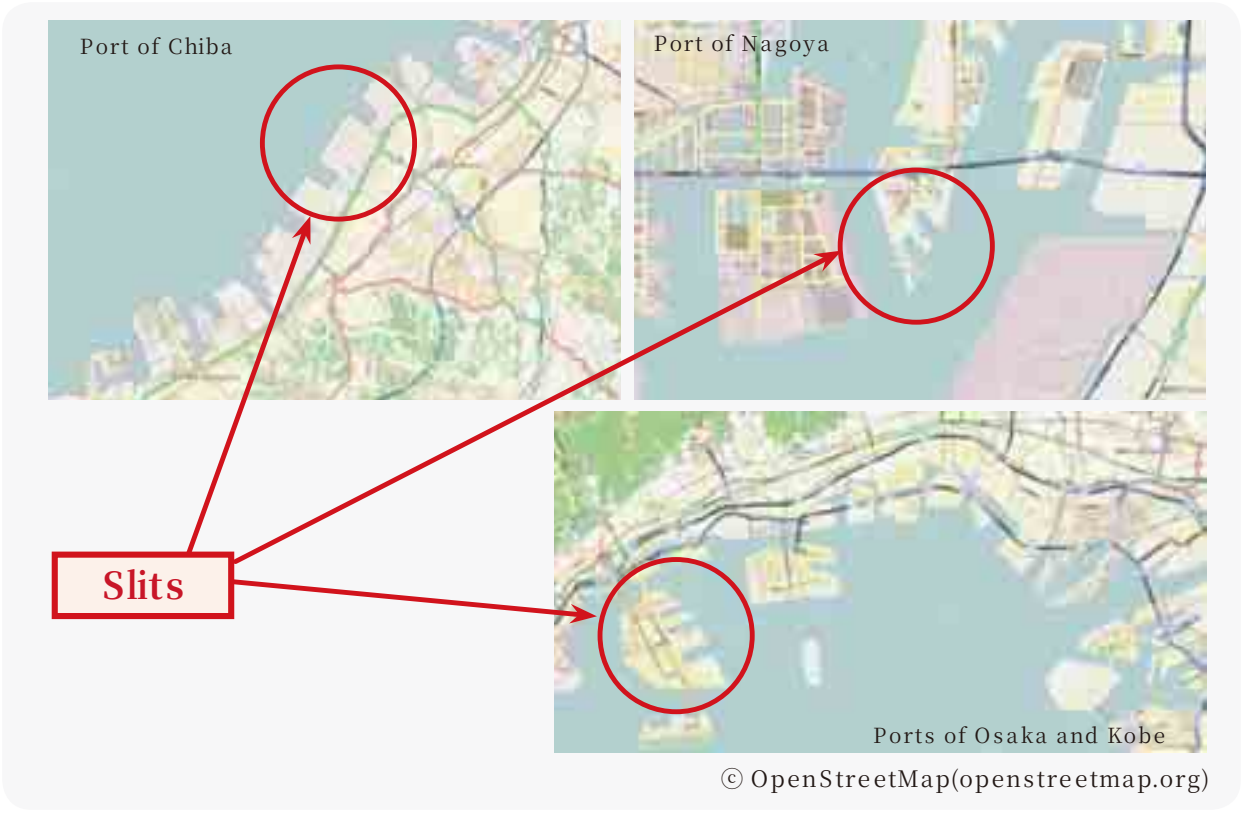
In terms of incidents by port, Antwerp in Belgium reported the highest number at 48, followed by Chiba, Nagoya, Kobe, and Osaka. Eleven of the worst 20 ports are located in Japan.

The Port of Antwerp requires passage through a lock before reaching the piers in the inner harbour, increasing the probability of contact with piers.

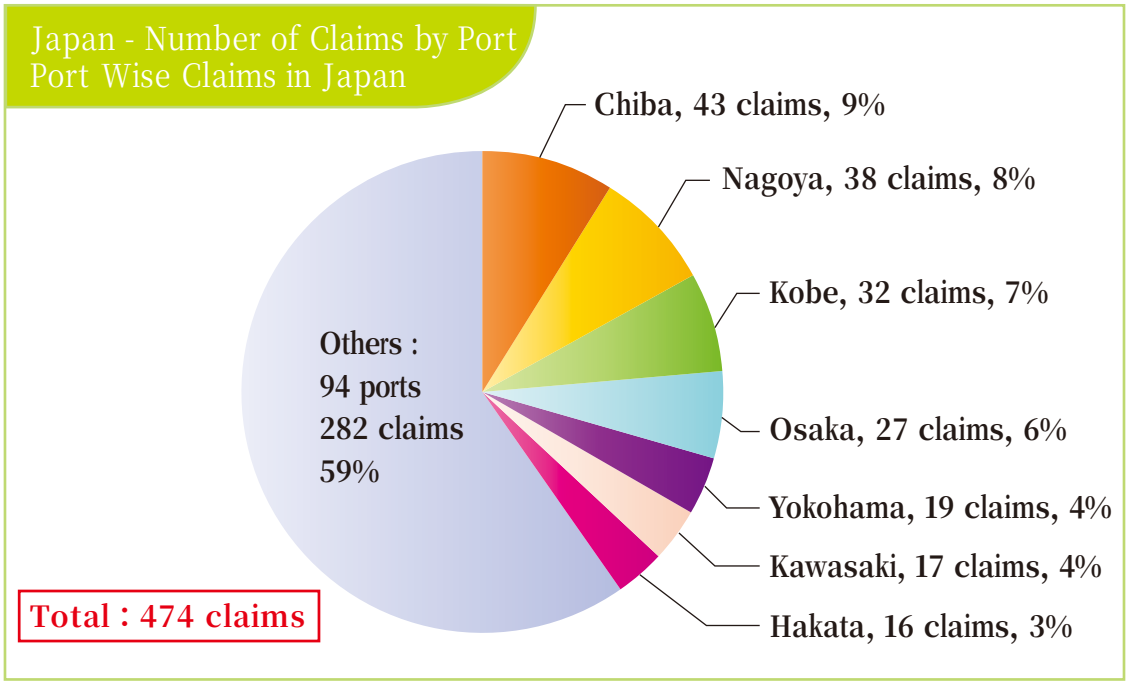


**Both ports have a large tidal range,
and passage to the confined inner harbour is therefore via locks.**

The ports of Chiba, Kobe, Osaka, and Nagoya all have large numbers of slit-type piers. It is considered that maneuvering of large vessels to piers in a comparatively confined operating area such as this is a reason for the large number of incidents. The Port of Nagoya, in particular, services large number of car carriers, with many incidents of damage to piers.

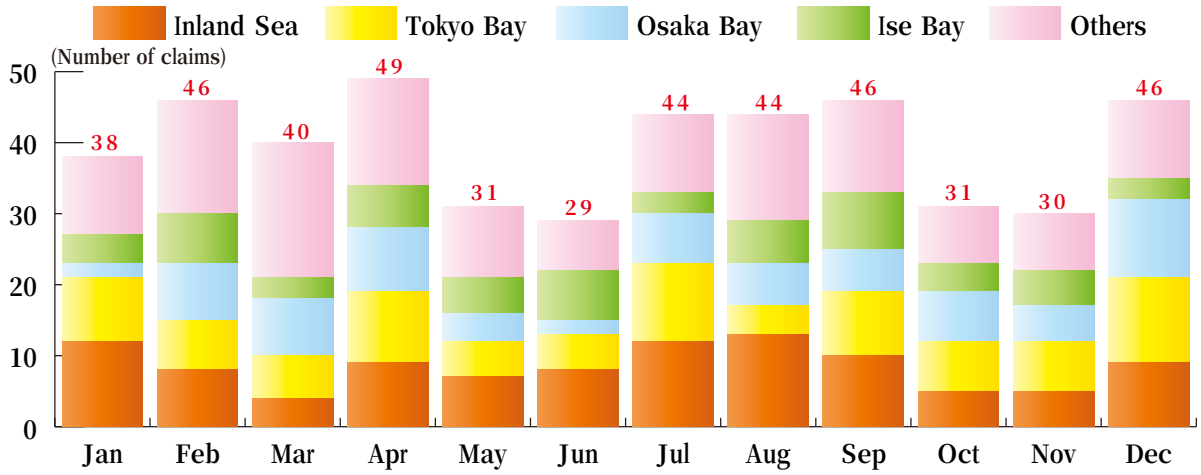


An analysis of the Japanese case (the greatest number of claims) shows that the worst seven ports account for 192 claims - 41% of the total. Within this number, the three ports in Tokyo Bay (Chiba, Yokohama, and Kawasaki) account for 79 claims (17%).



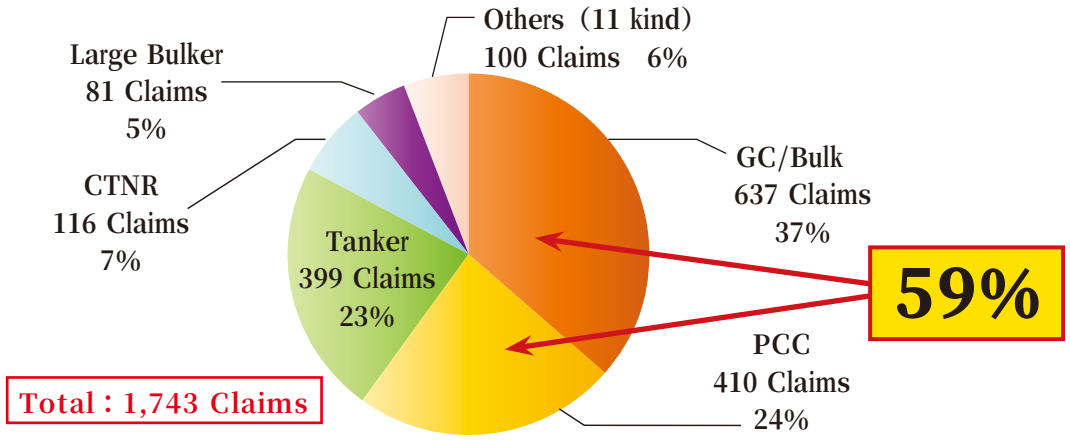
Comparatively few claims occurred in May-June and October-November, periods in which winds are relatively weak.

Japan - Number of Claims by Month (by Month in Japan)



2-6 Claims by Type of Vessel

Number of Claims by Vessel Type

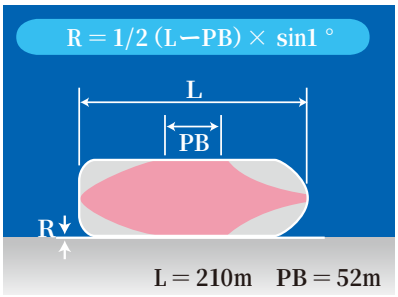


GC/Bulk	General cargo vessels/heavy lifters, bulkers less than 50,000 GT, multi-purpose vessels, reefers
Pure Car Carriers (PCC)	PCC, RO/RO ship
Tanker	All types of tankers
CTNR	Container vessels
Large bulkers	Bulkers more than 50,000 GT
Others	11 types of ships

Freighter (including PCCs and bulkers of less than 50,000GT) account for 59% of total

An analysis of the number of claims by type of vessel shows that PCC vessels accounted for 410 claims (24%), freighters including bulkers less than 50,000 GT accounted for 637 claims (37%). These two types of vessels accounted for 59% of the total number of claims.

The parallel body (PB) of PCCs is short, and the difficulty in maintaining control over the attitude of the vessel while approaching the pier often leads to incidents in which the bow or stern rides up onto the pier, damaging the pier and car stopper.



Freighters including bulkers less than 50,000 GT have the large hulls. Piers are relatively narrow in comparison to the hull when the ship is approaching, frequently resulting in damage to the pier.
Conventionally, the total number of each vessel type is used as the denominator when comparing the rate of occurrence of claims, however the number of vessels is not sufficient for statistical data, and the number of claims is therefore used.

USD 1,000

Ship's Kind	Over US$ 10mil.		US$ 5mil. < US$ 10mil.		US$100 thou. < US$ 5mil.		< US$ 100 thou.		Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Tanker			2	13,881	40	31,481	357	3,484	399	48,847
GC/Bulker					39	12,252	598	6,578	637	18,830
PCC			1	7,061	16	13,650	393	2,966	410	23,676
CTNR	2	26,895	1	5,825	11	7,979	102	952	116	41,651
Large Bulker	1	42,812			7	4,285	73	864	81	47,960
Others			2	15,190	11	5,140	87	733	100	21,064
Total	3	69,707	6	41,958	124	74,787	1,610	15,576	1,743	202,028

Only one PCC claim exceeded $5 million, with most being less than $100 thousand. A total of 14 container vessel claims exceeded $100 thousand (14% of container vessel claims).

Of the three claims exceeding $10 million, two were for container vessels. Both involved mistakes in control of the attitude of the vessel while approaching or leaving the pier, with the overhanging flare of the bow damaging gantry cranes, resulting in major costs for repairs and loss of earning.

One incident occurred with a large bulker in 2012PY, with claims exceeding $10 million accounting for 89% of the claims paid for this type of vessel.

2-7 Claims for Vessel Types by Port

Vessel types such as PCCs and general cargo/bulkers (less than 50,000 GT) caused incidents at the following ports.

PCC

Port		Whalf	Fender	Buoy	Crane	Others	Total
		No.	No.	No.	No.	No.	No.
Antwerp	BEL	14	17	1		3	35
Grimsby	GBR	14	9	1			24
Emden	DEU	5	6	1			12
Nagoya	JPN	11				1	12
Kobe	JPN	7	2			2	11
Zeebrugge	BEL	5	3		1	2	11
Yokohama	JPN	4	1			3	8
Baltimore	USA	4	1	1		1	7
Jeddah	SAU	2	5				7
Pyeongtaek	KOR	2	3			1	6
Top 10 ports S.Total		68	47	4	1	13	133
Others(183 Ports)		165	60	13	3	36	277
G.Total		233	107	17	4	49	410

Of the worst ten ports, four are in Europe, with relatively confined ports compared to vessel size.

GC/Bulker(less than 50,000 GT)

Port		Whalf	Fender	Buoy	Crane	Others	Total
		No.	No.	No.	No.	No.	No.
Chiba	JPN	11	3	2	1	4	21
Kobe	JPN	13	3				16
Nagoya	JPN	12		1	1	1	15
Osaka	JPN	8	2			2	12
Shanghai	PRC	3		5	3		11
Mizushima	JPN	6		4			10
Shimizu	JPN	6	2			1	9
Hakata	JPN	6				2	8
New Orleans	USA	6				2	8
Kashima	JPN	6				1	7
Top 10 ports S.Total		77	10	12	5	13	117
Others(351 Ports)		227	93	39	43	118	520
G.Total		304	103	51	48	131	637

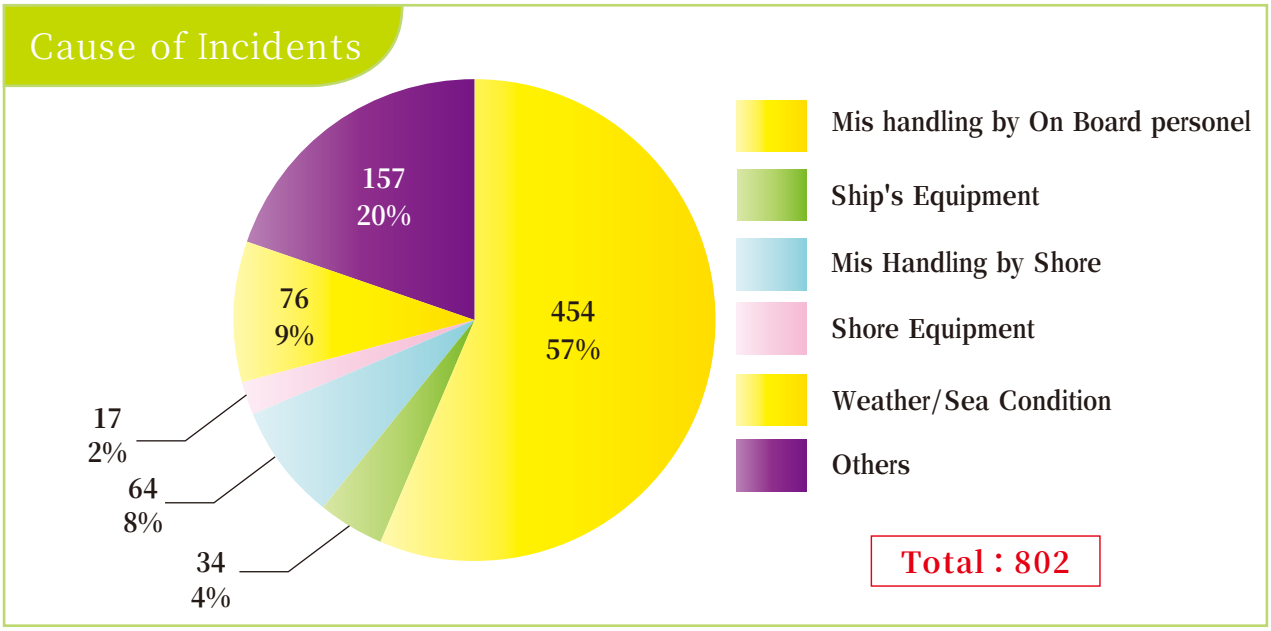
Of the worst ten ports, eight are in Japan, and account for 98 claims (15%).

2-8 Causes of Incidents

Out of all, we have identified the causes of 802 claims as can be seen in the table below.

(Number of Incidents)

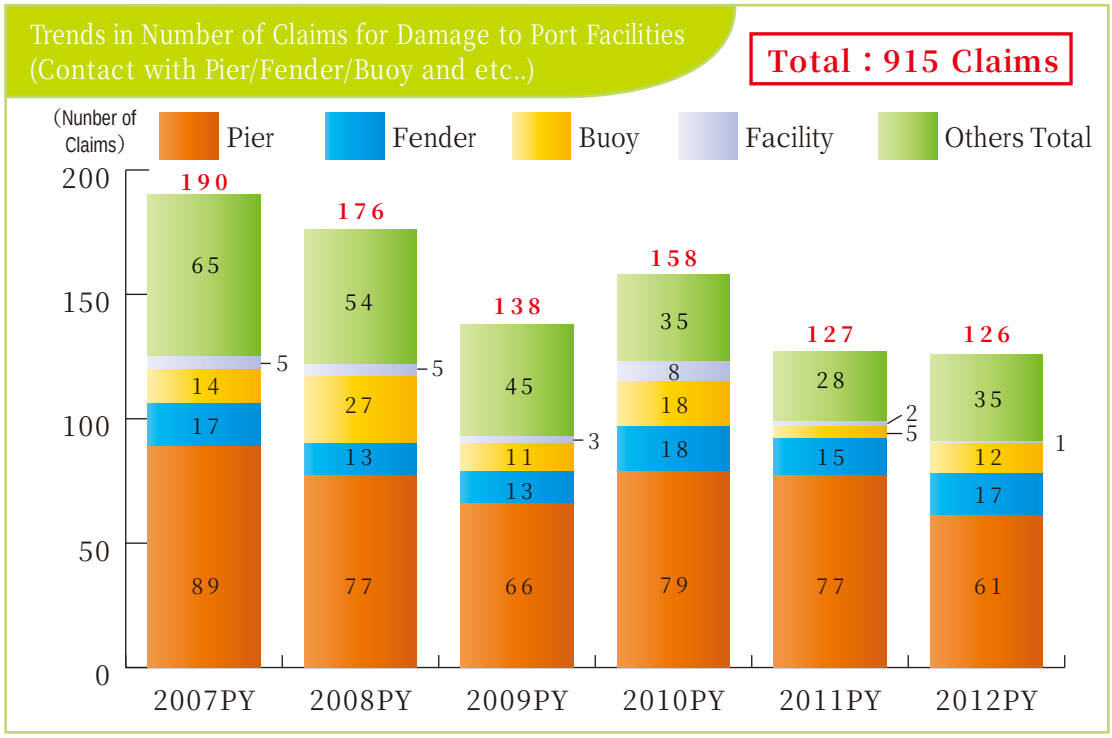
Cause of Incident		Whalf	Fender	Buoy	Crane	Others	Total	Ratio
Caused by Ship Side	Lack of Look Out	3		1		2	6	0.7%
	Mis Maneuvering by Crew	179	57	30	10	35	311	38.8%
	Mis Maneuvering by Pilot	61	25	5	8	10	109	13.6%
	Other Human Error	7	2	1	4	14	28	3.5%
	M/E, Gen/Rng. Trouble	4			1		5	0.6%
	Morring Equip. Trouble	3	3			4	10	1.2%
	Cargo Gear Trouble	1			3	6	10	1.2%
	Other Ship Equip. Trouble	3			3	3	9	1.1%
Other than Ship	Mis Handling by Shore	3	1		6	13	23	2.9%
	Mis Maneuvering by Other Ship	10	1	1	2	8	22	2.7%
	Mis Handling by Tug/Others	14	3			2	19	2.4%
	Other Shore Equip. Trouble	8	4	1		4	17	2.1%
Others	Weather/Sea Condition	33	24	6	5	8	76	9.5%
	Others	70	27	12	10	38	157	19.6%
Total		399	147	57	52	147	802	100.0%



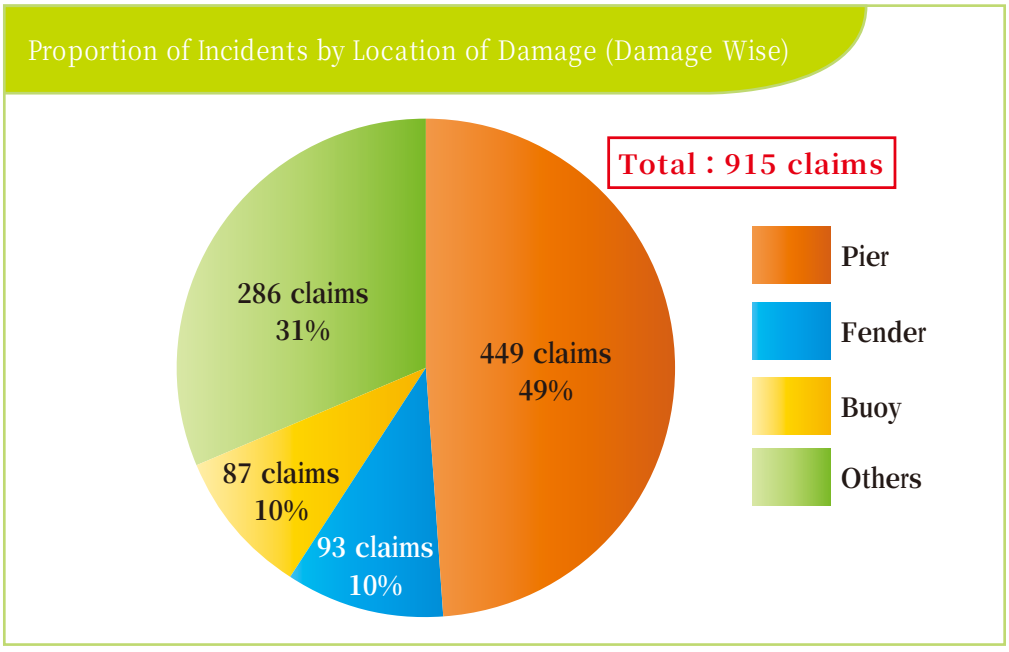
Approximately half of the incidents were due to mistakes in operation by crew or the pilot.
However, since the ship navigator must consider weather and sea conditions upon maneuvering, if associated problems are included, 66% of incidents can be attributed to human error on the vessel.

3. Claim Statistics (coastal vessels)

3-1 Trends in Number of Claims

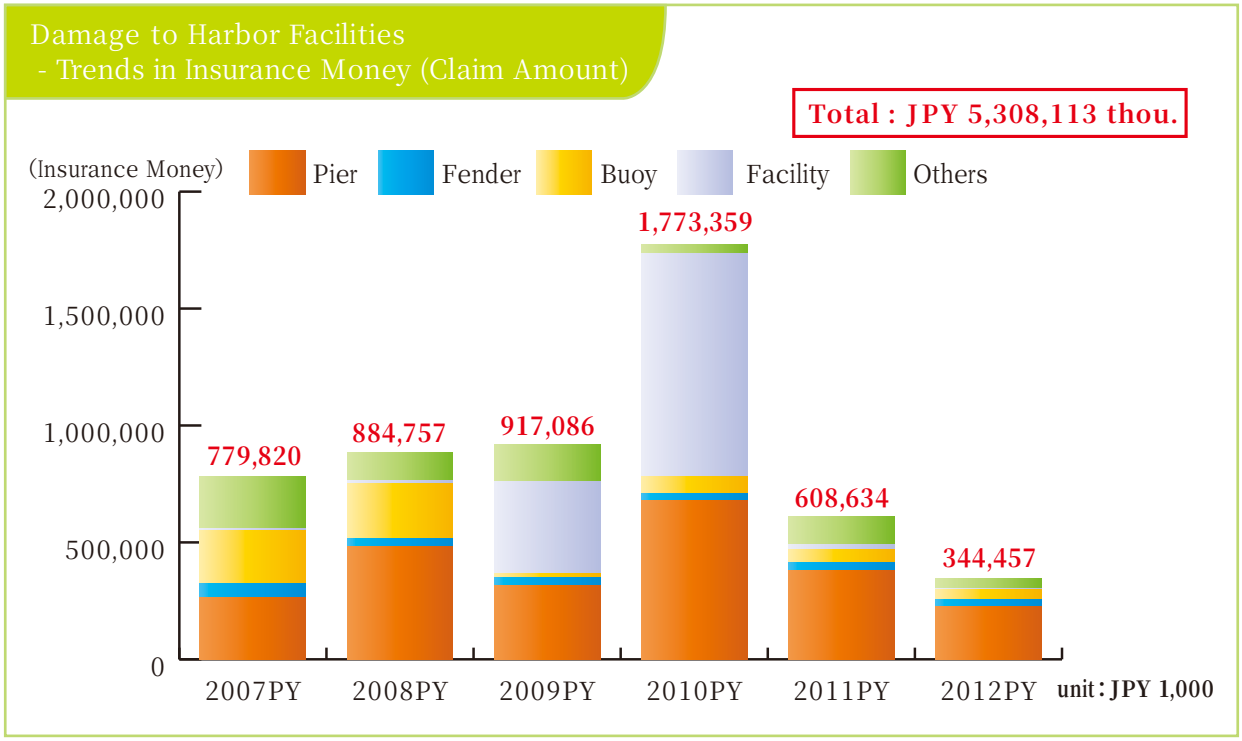


The number of claims in 2010PY increased slightly over the previous PY, while the general trend since 2007PY has been a decrease. However, dividing the rate of occurrence of claims by the number of entered vessels at the beginning of the PY shows a trend of approximately 5%, indicating that the incident rate is stable.

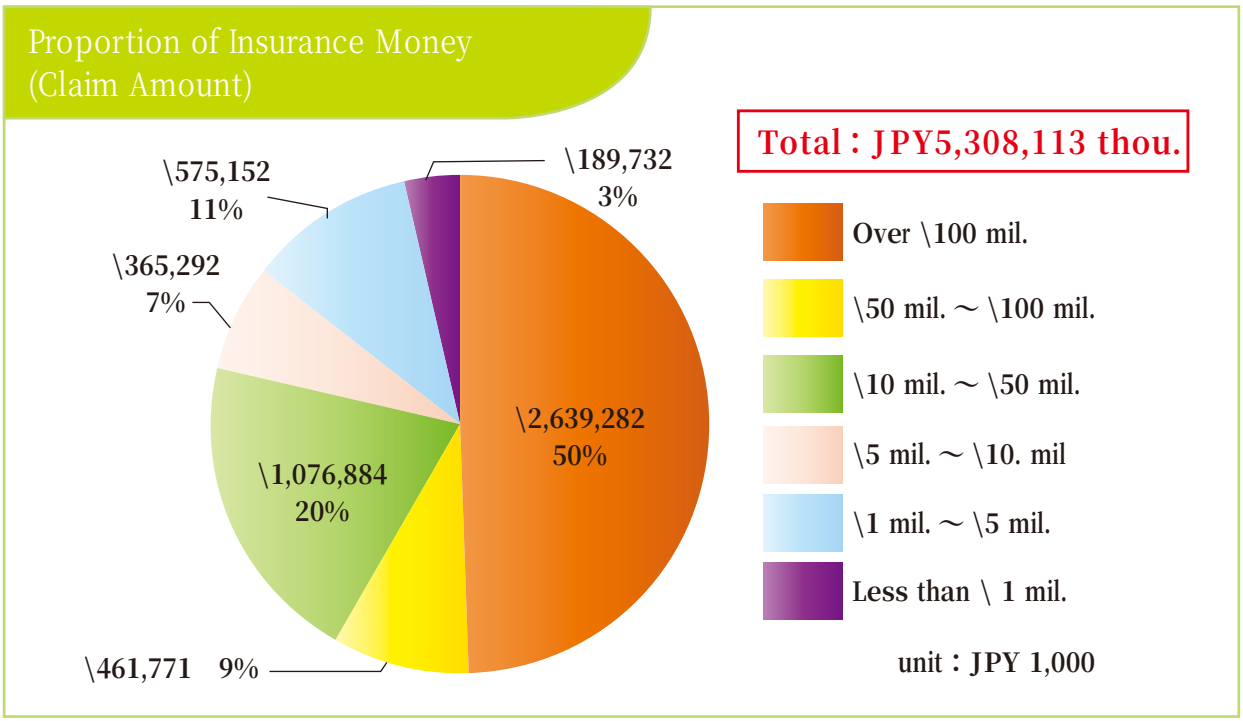


In terms of location of damage, damage to piers accounted for approximately half, with damage to fenders and buoys each accounting for 10%. The proportion of damage to buoys is high in comparison to ocean-going vessels.

3-2 Trends in Claims Paid



The figures for 2010PY are notable due to an incident in which damage to shore facilities (a loader) resulted in a claim paid of JPY930 million. Apart from this incident, the trend from 2009PY is a decrease in claims paid.



Number of Claims by Insurance Money Band　　Unit : JPY1,000

Insurance money band	No.	Proportion (%)	Amount	Proportion (%)
Over \100 mil.	12	1.3%	2,639,282	49.7%
\50 mil. ～ \100 mil.	6	0.7%	461,771	8.7%
\10 mil. ～ \50 mil.	52	5.7%	1,076,884	20.3%
Over \10 mil. Total	**70**	**7.7%**	**4,177,937**	**78.7%**
\5 mil. ～ \10. mil	52	5.7%	365,292	6.9%
\1 mil. ～ \5 mil.	256	28.0%	575,152	10.8%
Less than \ 1 mil.	537	58.7%	189,732	3.6%
Less than \10 mil.	**845**	**92.3%**	**1,130,176**	**21.3%**
G.Total	**915**	**100.0%**	**5,308,113**	**100.0%**

The proportion of large claims of JPY100 million or more is 1.3%, while the proportion of claims paid is 50%. While 70 claims (8%) of JPY10 million or more were received, they comprised approximately 80% of the total claims paid.

Unit : JPY1,000

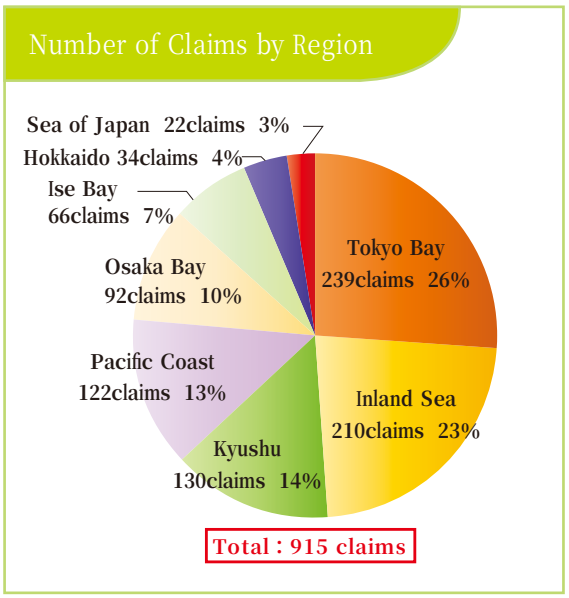
Insurance money band	2007PY		2008PY		2009PY		2010PY		2011PY		2012PY		Total			
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	%	Amount	%
Over \100 mil.	2	266,334	3	419,464	2	519,346	3	1,204,330	1	101,516	1	128,293	12	1%	2,639,282	50%
\50 mil. < \100 mil.							3	252,386	3	209,385			6	1%	461,771	9%
\10 mil. < \50 mil.	11	278,005	11	198,878	8	222,612	10	181,249	8	137,263	4	58,876	52	6%	1,076,884	20%
Over \10 mil. Total	13	544,339	14	618,343	10	741,958	16	1,637,966	12	448,164	5	187,168	70	8%	4,177,937	79%
\5 mil. < \10 mil	11	72,285	15	108,827	9	62,025	4	29,085	7	51,726	6	41,344	52	6%	365,292	7%
\1 mil. < \5 mil.	62	122,173	50	120,469	39	85,504	33	73,126	34	81,038	38	92,842	256	28%	575,152	11%
Less than \ 1 mil.	104	41,024	97	37,119	80	27,598	105	33,182	74	27,707	77	23,103	537	59%	189,732	4%
Less than \10 mil.	177	235,482	162	266,415	128	175,128	142	135,393	115	160,470	121	157,289	845	92%	1,130,176	21%
G.Total	190	779,821	176	884,757	138	917,086	158	1,773,359	127	608,634	126	344,457	915	100%	5,308,113	100%

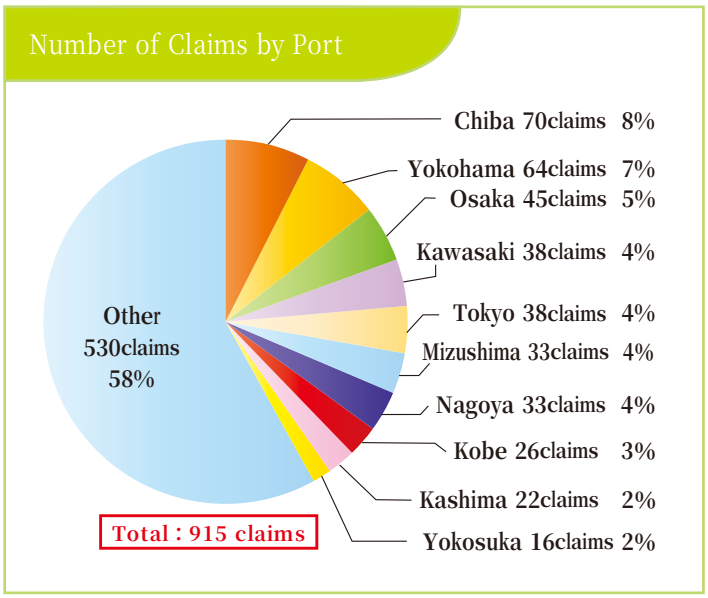
The high figure for 2010PY was due to 16 large claims of JPY10million or more. A total of 18 claims (2%) of JPY50 million or more were received, while the amount of claims paid were JPY3.1 billion (59%).

The same trend was apparent for ocean-going vessels, and while the proportion of claims was small, the proportion of claims paid out was more than 80%, indicating the significance of damage to harbour facilities.

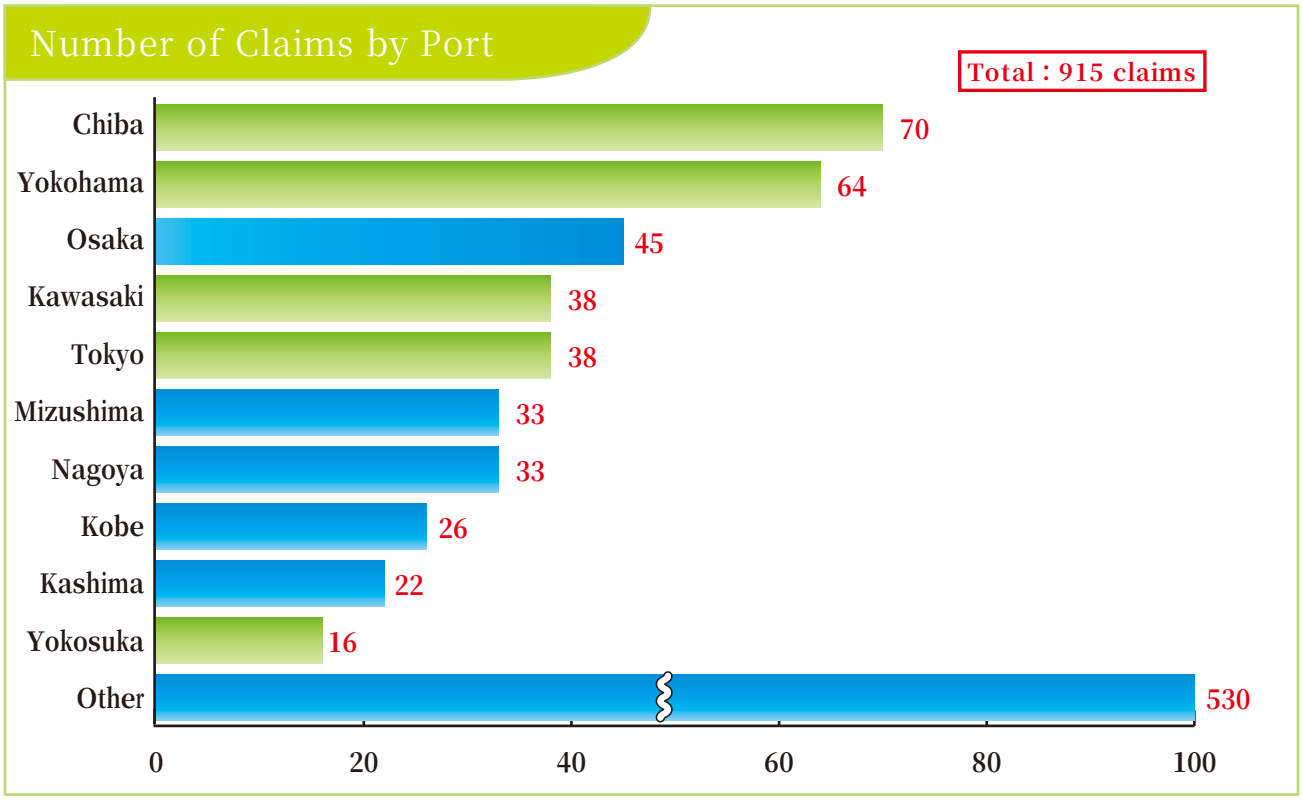
As with ocean-going vessels, the high proportion of insurance money for large vessels is a characteristic of damage to harbour facilities

3-3 Claims by Region and Harbour



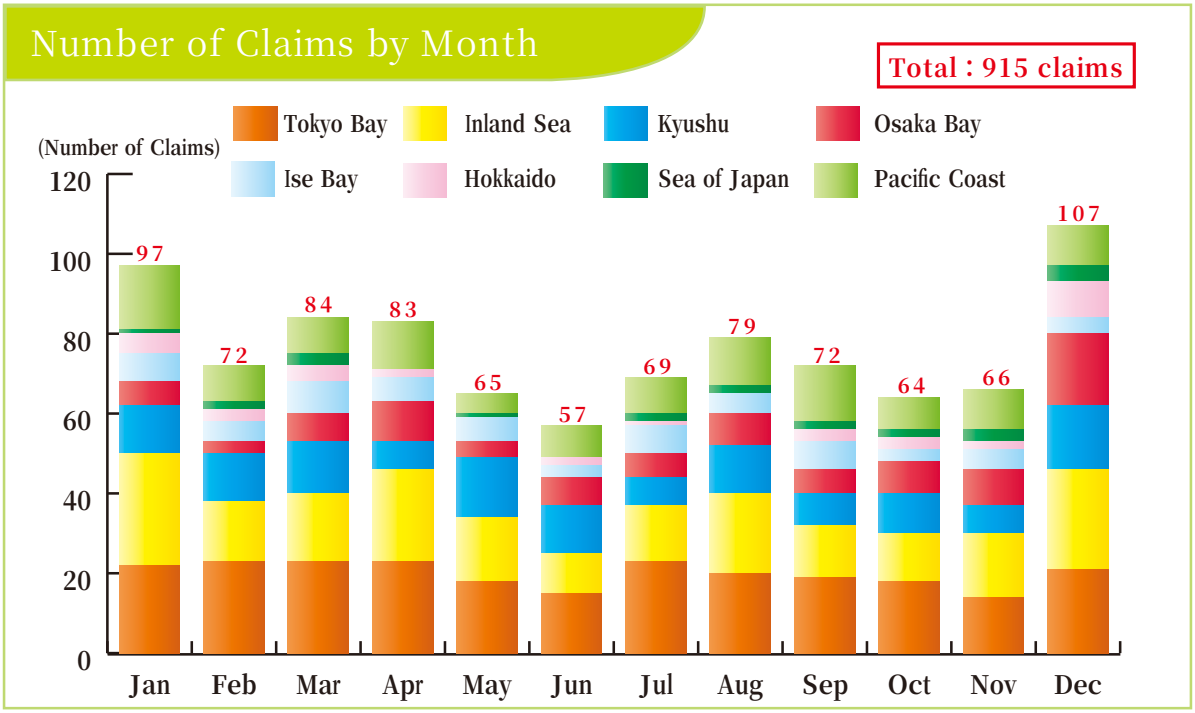


A total of 449 claims (almost 50%) occurred in Tokyo Bay and the Inland Sea. Claims occurred in the Kyushu region and in the Pacific coastal region came next to them.



The worst ten ports accounted for 385 claims (42%) including the claims in the five ports in Tokyo Bay. As with ocean-going vessels, the port of Chiba had the highest number of claims.

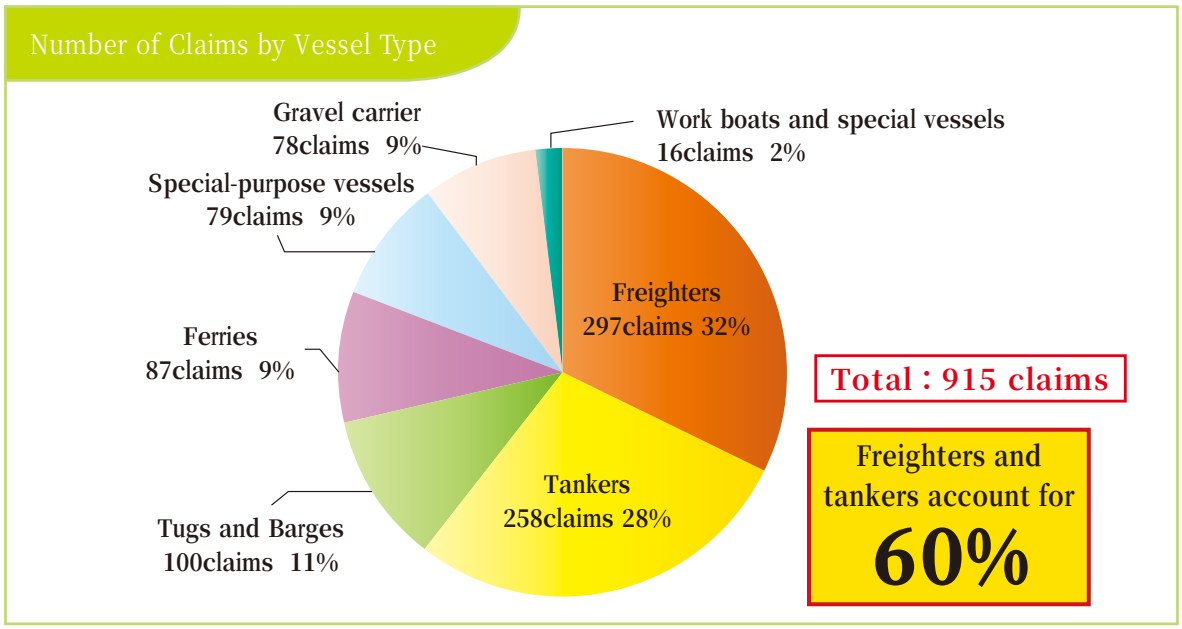
3-4 Number of Claims by Month



Compared to other months, the number of claims regarding ocean-going vessels was slightly less during the relatively calmer weather in May-June and October-November, however the difference between the months over the year is not great. On the other hand, the rate of occurrence of claims for coastal vessels is considerable at the end and beginning of the year. This may be for unique Japanese reasons. It is therefore important to exercise caution to prevent incidents towards the end of the year.

It is important to exercise caution to prevent incidents towards the end of the year

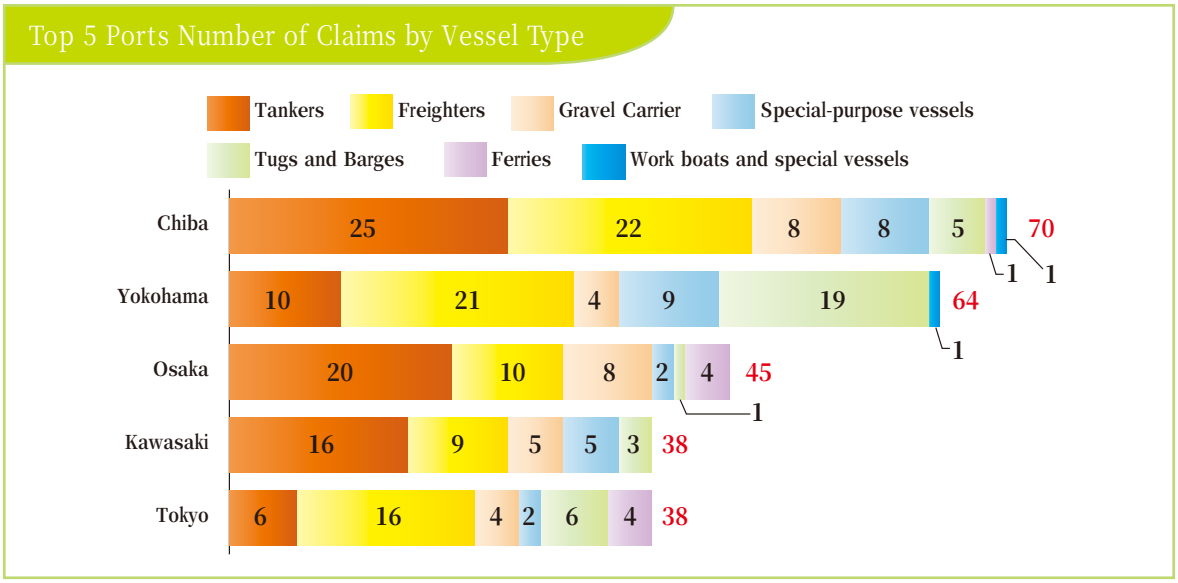
3-5 Number of Claims by Vessel Type



Many of the vessels entered in this Association are freighters and tankers, hence the numbers shown in the diagram

above. Conventionally, the total number of each vessel type is used as the denominator when comparing the rate of occurrence of incidents, however, as with ocean-going vessels, the number of vessels is not sufficient for statistical data, and the number of incidents is therefore used.

A comparison by vessel type of ports in which incidents occurred is shown below. As with ocean-going vessels, the number of incidents was greatest at the port of Chiba.



Claims by Vessel Type and Insurance Band

unit : JPY1,000

Vessel Type	JPY100,000,000 or more		JPY50,000,000 - JPY100,000,000		JPY10,000,000 - JPY50,000,000		Up to JPY10,000,000		Total	
	Number of claims	Insurance money	Number of claims	Insurance money	Number of claims	Insurance money	Number of claims	Insurance money	Number of claims	Insurance money
Tankers	3	667,677	4	292,165	18	385,394	233	291,887	258	1,637,123
Special-purpose vessels	2	1,047,336	0	0	2	44,623	75	96,866	79	1,188,824
Freighters	3	384,297	0	0	13	277,723	281	332,909	297	994,929
Tugs and Barges	2	271,133	1	72,406	5	86,578	92	123,633	100	553,751
Gravel Carriers	1	120,345	1	97,200	2	59,462	74	108,935	78	385,942
Ferries	0	0	0	0	11	205,201	76	159,923	87	365,123
Work boats and special vessels	1	148,494	0	0	1	17,904	14	16,023	16	182,421
Total	12	2,639,282	6	461,771	52	1,076,884	845	1,130,176	915	5,308,113

Of the 18 claims for JPY50million or more,
7 (39%) were by tankers

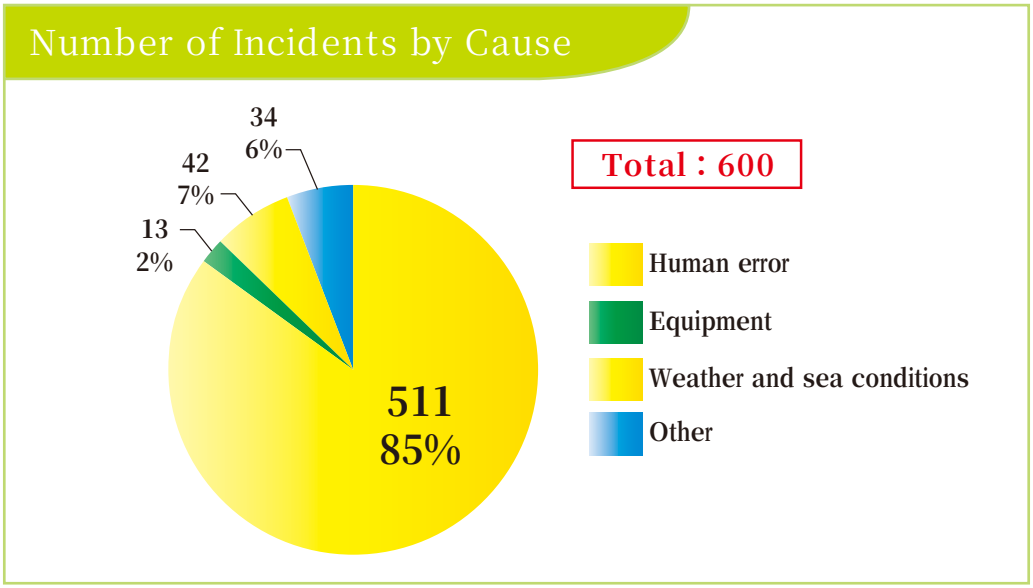
In terms of claims paid by vessel type, many high-value claims relate to tankers, and the amount for claims for damage to shore facilities is considerable.

3-6 Causes of Incidents

Out of all, we have identified the causes of 600 claims as can be seen in the table below.

Nunber of Incidents by Cause

Cause		Piers	Fenders	Buoys	Loading equipment	Other	Total	Proportion
Human error	Mistakes in vessel handling	224	49	35	11	119	438	73.0%
	Not paying attention	5	1	14	0	6	26	4.3%
	Asleep on watch	1		0	0	2	3	0.5%
	Mistakes in vessel handling by pilot			0	0	1	1	0.2%
	Human error on vessel	13	3	0	1	26	43	7.2%
Equipment	Problems with main engine or generator etc.	2		0	0	0	2	0.3%
	Problems with mooring equipment	3	1	0	0	1	5	0.8%
	Problems with loading equipment			0	0	1	1	0.2%
	Problems with equipment on vessel	4	1	0	0	0	5	0.8%
Other	Weather and sea conditions	23	6	4	2	7	42	7.0%
	Other	20	5	2	1	6	34	5.7%
Total		295	66	55	15	169	600	100.0%



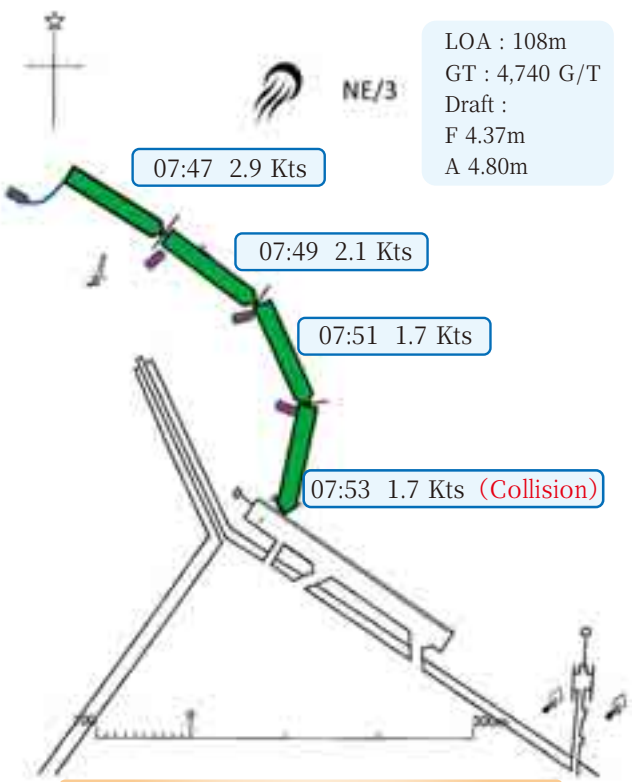
Approximately 85% of incidents are attributable to human error. However, since the ship navigator must consider weather and sea conditions, if associated problems are included, 92% of incidents can be attributed to human error.

4. Incident Examples

The following presents two examples of incidents due to insufficient communication between pilot and captain, and one due to insufficient prior investigation of harbour conditions.

4-1 Example 1

06 : 55	Pilot boards vessel. Presents pilot card. Verifies primary details of vessel and draft. Explains that one tug is taken on starboard. No explanation of handling procedure. Planning to turn vessel in front of berth, parallel with pier at completion of turn and maneuver vessel as close as possible.
07 : 47	Speed 2.9 knots. Dead slow ahead. Leeway 3° in leeward direction. Straight-line distance to pier 320m (3L) .
07 : 49	Speed 2.1 knots. Engine stopped. Tug pushing at stern on starboard side, right turn commenced. 220m (2L) to pier.
07 : 51	Speed 1.7 knots. Engine stopped. Continued turn to starboard. 120m (1L) to pier.
07 : 52	Captain, worried. Half astern engine.
07 : 53	Collided with pier at 1.7 knots.

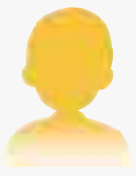


Korean captain with Indonesian Crew

Cause of incident

Direct cause: Mistake in handling of vessel by pilot.

- **Insufficient verification of proximity** of bow and pier.
- **Did not reduce speed** at distance of 1L (approximately 100m) from pier.



Indirect cause: Pilot

- **Did not explain procedure for approaching pier** to captain.
- **Only took notice of distance reported by tug** (tug reported 60m immediately before collision, but crew reported 35m).

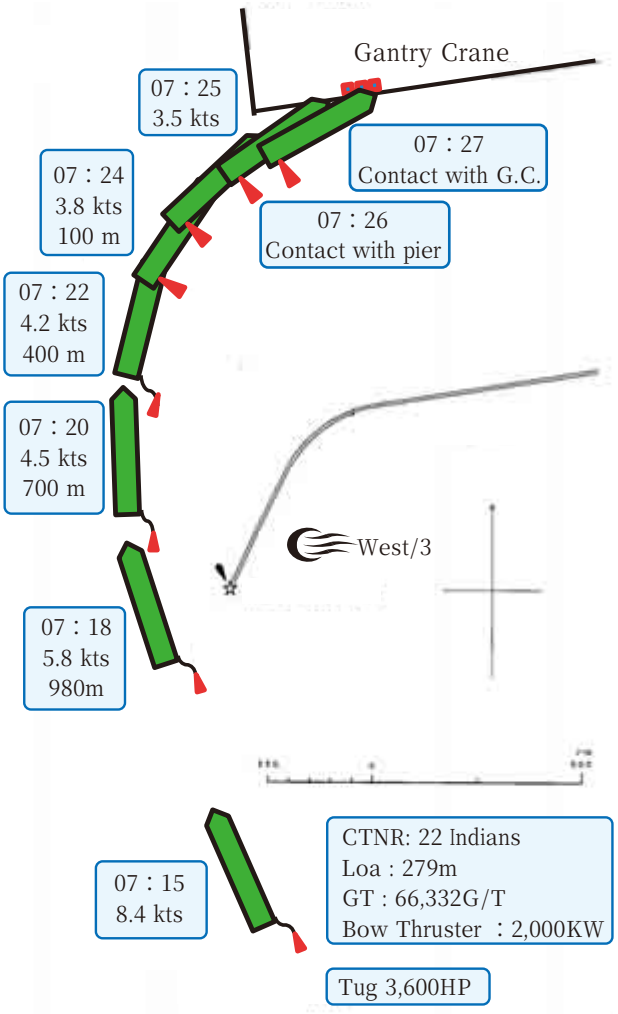
Indirect cause: Captain

- **Did not report distance at bow to pilot.**
- **Left maneuvering of vessel up to pilot.**

Insufficient communication between crew and pilot. Problems with bridge resource management.

4-2 Example 2

06 : 35	Pilot boarded vessel. Did not explain procedure for operating the vessel to the captain.
07 : 15	Began reducing speed at 600m from breakwater. Took tug on starboard quarter. Dead slow ahead engine.
07 : 18	Passed through breakwater. 5.8 knots dead slow ahead engine. Commenced using tug for braking.
07 : 20	Began starboard turn with rudder. 700m (2.5L) to pier. Speed 4.5 knots. Engine stopped.
07 : 22	400m (1.4L) to pier. Speed 4.2 knots. Engine remained stopped. Noticed that the rate of turn (ROT) was not increasing enough.
07 : 24	100m (0.4L) to corner of pier. Tug prepared only for push. Dead slow ahead engine to increase ROT. Speed 3.8 knots.
07 : 25	60m to pier. Speed 3.5 knots. Starboard turn with tug and bow thruster to bring vessel parallel to pier. Engine full astern.
07 : 26	Contact with pier.
07 : 27	Engine stopped. Contact with gantry crane at speed of 0.5 knots.



Cause of incident

Direct cause: Mistake in handling of vessel by pilot

- 07 : 22 **Left unchanged** despite no increase in ROT.
- Excessive speed between 07:22 and 07:24 (**4 knots at distance of 1.4 – 0.4L from pier**).
- 07 : 25 Excessive speed with no attempt to reduce speed, and **forward engine** in attempt to increase ROT.
- Inappropriate use of bow thruster and tug. Forward speed reduces the effect of the bow thruster, and reduces the force available from the tug when turning.

Indirect cause: Pilot

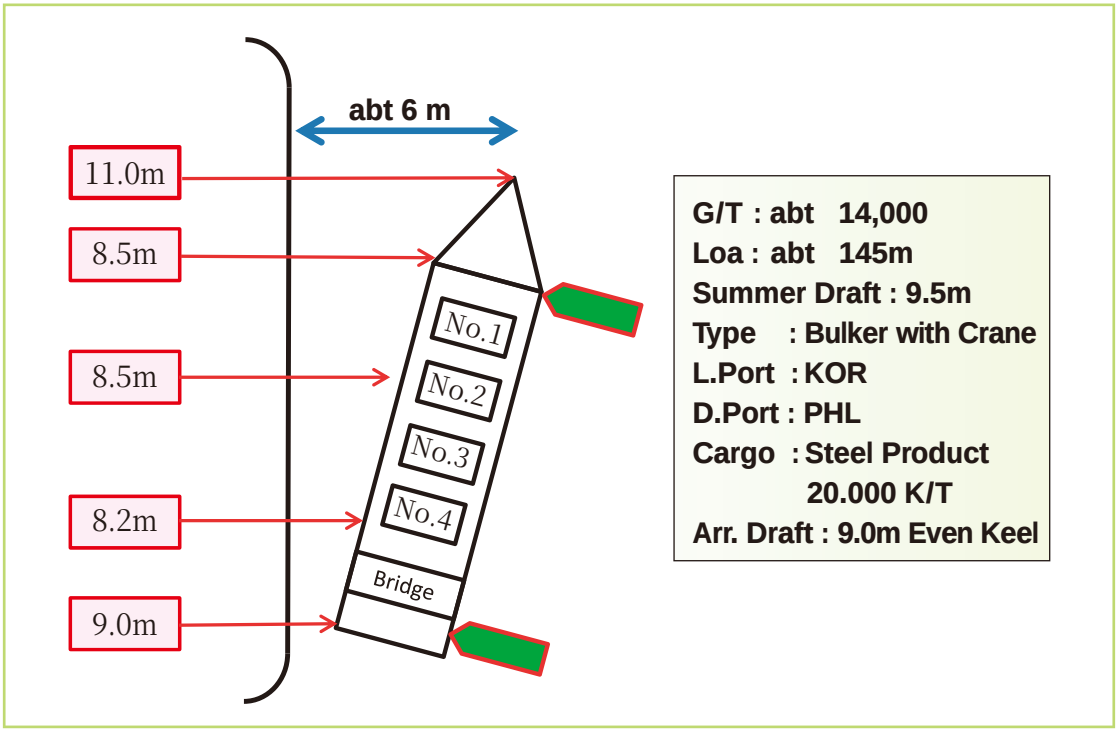
- **Did not explain handling procedure** to captain.

Indirect cause: Captain

- **Did not report distance between bow and pier to pilot.**
- **Left steering of vessel up to pilot.**

Insufficient communication between crew and pilot. Problems with bridge resource management.

4-3 Example 3



- This was the first time the vessel had entered the port.
- While approaching the pier, the vessel was pushed by the tug, and stopped at approximately 6m from the pier.
- Depth measurements at the points shown in the diagram above showed that the vessel had grounded.
- Soft mud prevented damage to the hull of the vessel.

Error chain

The error chain was as follows. A break in this chain would have prevented the incident.

① When chartering the vessel, the charterer of the vessel received information via the agent that the maximum permissible allowable draft was 9.0m. It was later found that this was the depth at the pier.
⇒ Insufficient investigation of harbour conditions.

② The vessel owner conveyed the charterer's information to the vessel without question.
⇒ The conditions in the port were not investigated and verified.

③ The vessel also accepted the charterer's and owner's information without question, and did not investigate the conditions in the port on its own.
⇒ The conditions in the port were not investigated and verified.

④ The local agent received the ETA information that notified the arrival draft was 9.0m at the time the vessel departed the port of loading, but overlooked it.
⇒ Vessel information not verified.

⑤ After the pilot boarded the vessel, the vessel exchanged draft information on the pilot card, however the pilot did not verify this information.
⇒ Draft not verified, and incomplete BRM between pilot and vessel.

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