No.4
January, 2008

Marine Accident Inquiry Agency

MAIA DIGEST

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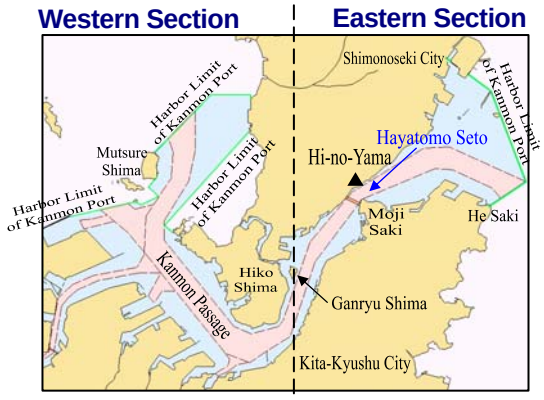
Marine Accidents in Kanmon Kaikyo (Strait)

General Description of Kanmon Kaikyo

Kanmon Kaikyo is a narrow strait—with a navigable width of only about 500 meters at the narrowest part, off Moji Saki—extending about 15 miles from He Saki in Moji-ku of Kita-Kyushu City to Mutsure Shima of Shimonoseki City. It features sharp bend, which prevent mariners from getting a view into the distance, and strong tidal current which sometimes exceed 9 knots. Despite such difficulties to navigation, Kanmon Kaikyo sees the passage of more than 600 vessels a day, including foreign-flag vessels which use the channel as a gateway to economically developing East Asia, such as China and Korea, making the strait a vital artery for maritime traffic.



Almost all of Kanmon Kaikyo lies within an area that is subject to the Port Regulations Law and, in recent years, the navigation environment of the area has been improved by such efforts as the extension of the Kanmon Passage both in length and width, and the reduction of the acuteness of bend of the same passage, installation of the Hiko Shima Leading light and synchronization of the flashing of the relevant light buoys. The introduction of compulsory sailing on the starboard side of the passage has helped bring about more orderly vessel flows, thus realizing increased safety for vessel transits through the channel.

The Kanmon Kaikyo Traffic Advisory Service Center (the Kanmon Martis) started operating a navigation support system for vessels equipped with AIS (automatic identification system) in July 2005.

Eastern Section of Kanmon Kaikyo

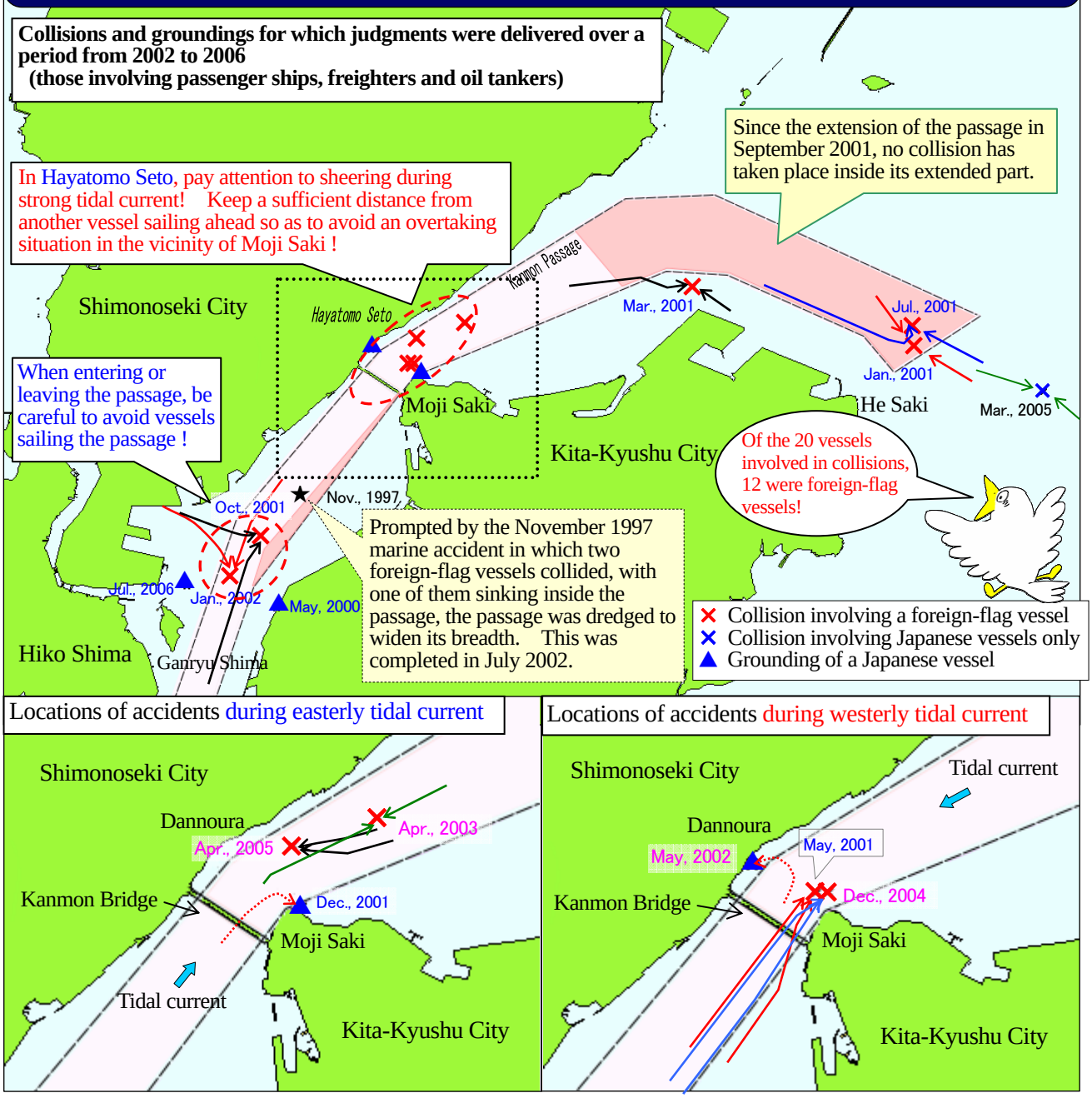
Situation of marine accidents in the eastern section of Kanmon Kaikyo

Among the marine accidents (collisions and groundings) for which judgments were delivered by the relevant marine accident inquiry agencies over a period of five years from 2002 to 2006, 10 collisions involving 20 vessels, and 4 groundings involving 4, occurred in the Kanmon Passage and its adjacent waters, lying to the east of the longitude of Ganryu Shima. Of the 20 vessels involved in the above collisions, 12, accounting for such a large proportion of 60%, were those registered in foreign countries.

By the location of the accident within the area, **4 collisions and 2 groundings occurred** in Hayatomo Seto; and **2 collisions and 2 groundings in the vicinity of the bend of the passage located to the northeast of Ganryu Shima**. At the eastern entrance to Kanmon Kaikyo, in waters off He Saki, 4 collisions occurred. However, **ever since the Kanmon Passage was extended to include waters off He Saki in September 2001, no collision has taken place in the extended portion of the passage.**

Hayatomo Seto viewed from Hino Yama in Shimonoseki City

Collisions and Groundings in the Eastern Section of Kanmon Kaikyo



◆ Cases of marine accidents in Hayatomo Seto — Reckless overtaking is strictly prohibited!

[During easterly tidal current]

- An eastbound vessel sailing close to the center of the passage took a sheer toward the side of Shimonoseki, after passing under the Kanmon Bridge, resulting in a collision with a westbound vessel.
- A westbound vessel which was about to overtake another vessel in Hayatomo Seto—from a location in the center or slightly to the port side of the passage—noticed an eastbound vessel and attempted to return to the starboard side of the passage. In the process, the vessel took a sheer toward the side of Shimonoseki and collided with the vessel being overtaken. (cf. Page 5).

[During westerly tidal current]

- An eastbound vessel located in the vicinity of the boundary line of the passage, where the tidal current was weak, was unintentionally brought in a situation to overtake another eastbound vessel which was sailing close to the center of the passage, where the tidal current was relatively strong, and caught up with the latter vessel in the vicinity of Moji Saki, resulting in a collision. (cf. Page 4)
- A vessel which had sailed in the vicinity of Moji Saki at a large angle against the direction of the tidal current, failed to make a turn because of a difference in pressure between the forward and aft parts of the vessel, resulting in a grounding.

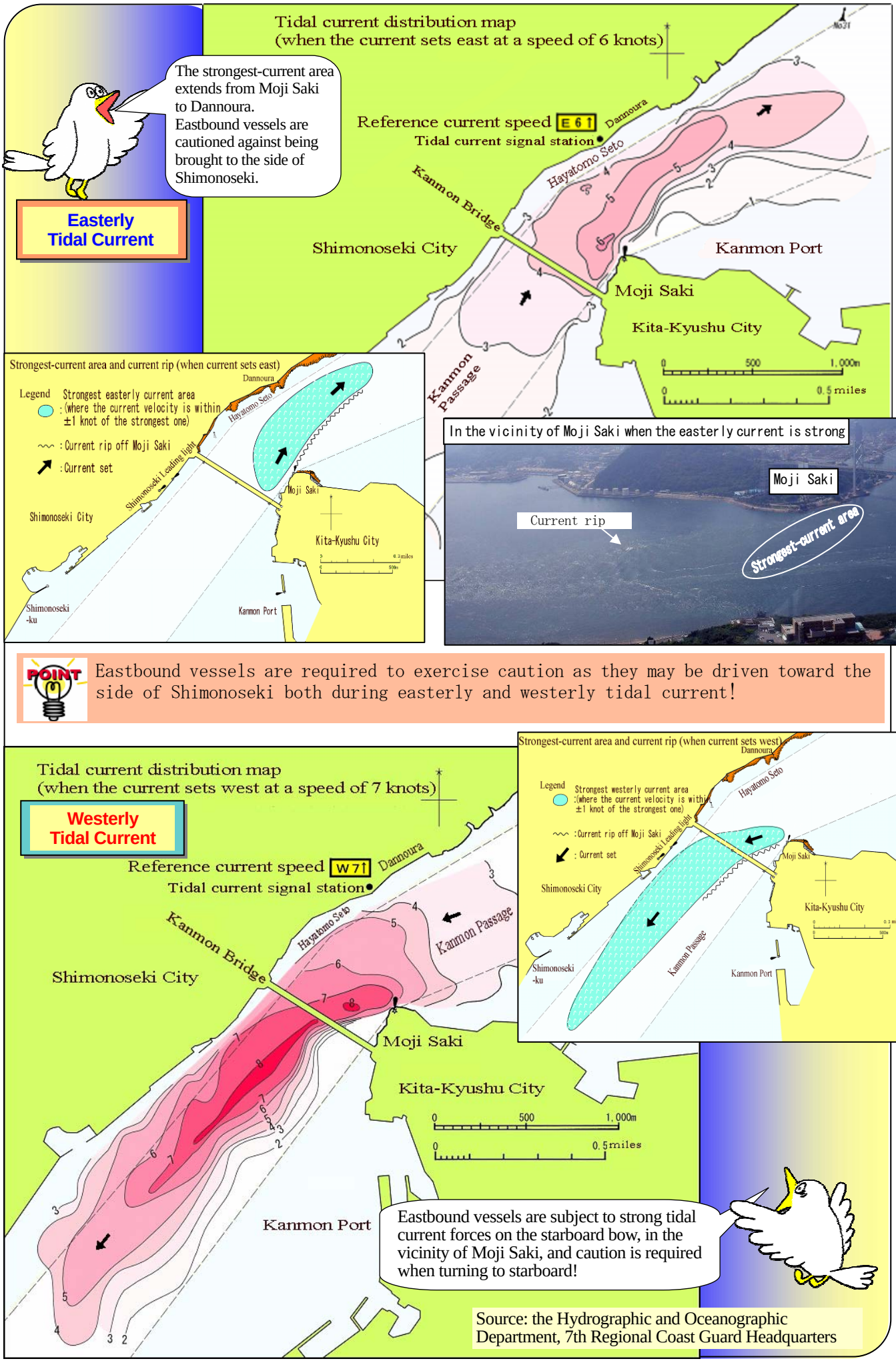
◆ Tidal current in the vicinity of Hayatomo Seto — Sensible navigation with a knowledge of tidal current!

In Hayatomo Seto, the westerly tidal current is strongest at about the time of high tide in Moji Saki and Dannoura, and the easterly tidal current is strongest at about the time of low in both places.

The area with the strongest tidal current (strongest-current area) in the vicinity of Moji Saki stretches from the north to the west (close to the center of the passage) of a current rip which extends from off Moji Saki.

- During easterly tidal current: Area 200 to 300 meters wide and about 1,200 meters long; it extends northeastward, from the vicinity of Moji Saki, along the Kanmon Passage, but slightly closer to Shimonoseki.
- During westerly tidal current: Area 150 to 300 meters wide and about 2,000 meters long; it extends southwestward, from the vicinity of Moji Saki, along the Kanmon Passage, but slightly closer to Shimonoseki.

(Source: the Hydrographic and Oceanographic Department, 7th Regional Coast Guard Headquarters; see the next page)

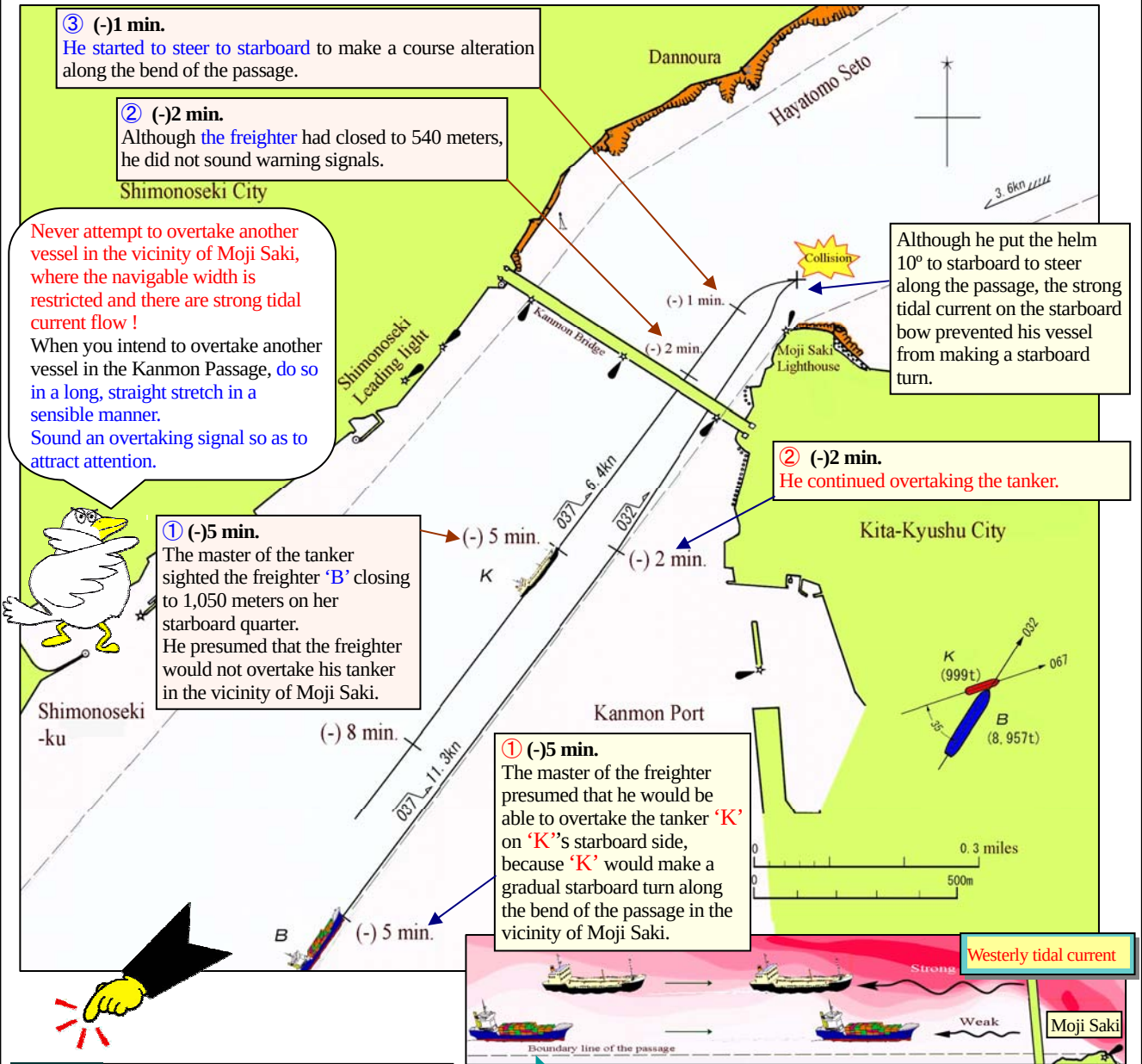

Tidal current distribution map
(when the current sets east at a speed of 6 knots)
The strongest-current area extends from Moji Saki to Dannoura. Eastbound vessels are cautioned against being brought to the side of Shimonoseki.
Easterly Tidal Current
Reference current speed E61
Tidal current signal station
Dannoura
Hayatomo Seto
Kanmon Bridge
Shimonoseki City
Kanmon Port
Moji Saki
Kita-Kyushu City
Kanmon Passage
0 500 1,000m
0 0.5 miles
Strongest-current area and current rip (when current sets east)
Legend
Strongest easterly current area :(where the current velocity is within ±1 knot of the strongest one)
: Current rip off Moji Saki
: Current set
Shimonoseki Leading light
Shimonoseki -ku
In the vicinity of Moji Saki when the easterly current is strong
Current rip
Strongest-current area
POINT
Eastbound vessels are required to exercise caution as they may be driven toward the side of Shimonoseki both during easterly and westerly tidal current!
Tidal current distribution map
(when the current sets west at a speed of 7 knots)
Westerly Tidal Current
Reference current speed W71
Tidal current signal station
Strongest-current area and current rip (when current sets west)
Strongest westerly current area :(where the current velocity is within ±1 knot of the strongest one)
: Current rip off Moji Saki
: Current set
Eastbound vessels are subject to strong tidal current forces on the starboard bow, in the vicinity of Moji Saki, and caution is required when turning to starboard!
Source: the Hydrographic and Oceanographic Department, 7th Regional Coast Guard Headquarters

(Case Study 1) A foreign-flag vessel collided with a tanker, in an overtaking situation, off Moji Saki where a west current flowed at a speed of 3.6 knots

Summary

The Japanese tanker 'K' was sailing northeastward under the conn of the master, in the manual steering mode, on the starboard side of the passage, in strong tidal current. The master noticed the Malaysian-flag freighter 'B' approaching from his starboard quarter. However, presuming that the freighter would not overtake his own tanker, he did not monitor the movement of the freighter. Meanwhile, the freighter 'B' was sailing northeastward, under the conn of the master, in manual steering mode, close to the outer limit on the starboard side of the passage, where the tidal current was relatively weak. The master of the freighter 'B' judged that, even had his vessel drawn nearer to the tanker—which was sailing ahead of him—in the vicinity of Moji Saki, he would be able to overtake her safely, because the tanker would make a gradual starboard turn along the bend of the passage. Therefore, he continued to overtake the tanker without sounding overtaking signals. The freighter 'B' steered to port, 2 minutes before the collision, so as to keep away from Moji Saki and, then, steered to starboard after passing under the Kanmon Bridge. However, the freighter was not able to swing to starboard—because she was overcome by the strong westerly tidal current coming from his starboard bow—resulting in a collision.

A freighter sailing eastward near the position of the collision



Specified sailing rules

A vessel is allowed to overtake another one in the Kanmon Passage, only 'if she needs no cooperative action, for her safe passage, from the vessel being overtaken' and, in addition, 'if she can safely keep out of the way of the other.'

But

Even if you have no intention to overtake another vessel !

There is a need to exercise caution. During westerly tidal current, an eastbound vessel sailing in the vicinity of the boundary line of the passage, where the tidal current is weak, can be unintentionally brought in a situation in which she overtakes another eastbound vessel sailing close to the center of the passage, where the tidal current is relatively strong.

(Case Study 2) In Hayatomo Seto, during easterly tidal current of 6 knots, a foreign freighter collided with a Japanese tanker as the freighter tried to overtake the tanker from the port side of the passage

Summary

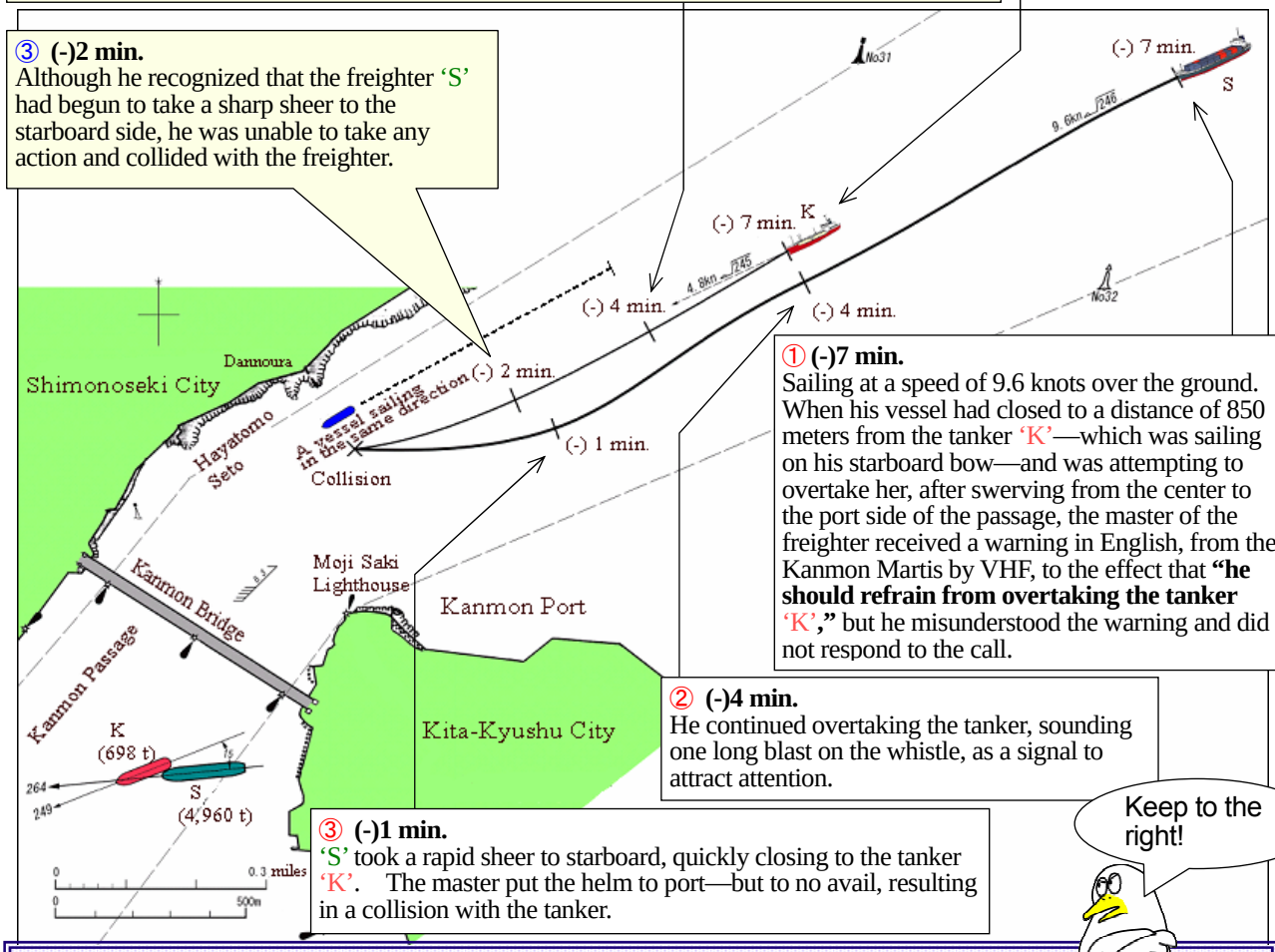
The Panamanian-flag freighter 'S' was sailing southwestward in the center of the Kanmon Passage, at the entrance to Hayatomo Seto, with the intention to overtake the Japanese tanker 'K', when Kanmon Kaikyo Traffic Advisory Service Center (the Kanmon Martis) gave a warning to the freighter by VHF, saying, "Never overtake the tanker 'K'." The freighter, however, did not respond to this call and continued overtaking the tanker, by proceeding to the port side of the passage. At about the same time, the freighter noticed the lights of two eastbound vessels and attempted to return slightly to her starboard side, but she took a rapid sheer toward the side of Shimonoseki, resulting in a collision with the tanker 'K'.

S

① **(-)7 min.**
Sailing at a speed over the ground of 4.8 knots against an easterly tidal current
The master of the tanker overheard the Kanmon Martis tells the freighter 'S', sailing behind him, not to overtake his tanker. On the radar screen, set on the 1.5 miles range scale, he saw the echo of the freighter 2° on his port quarter, 850 meters off. Shortly after, he was advised by the Kanmon Martis over the VHF telephone to pay attention to the freighter 'S'.

② **(-)4 min.**
A small vessel, sailing in the same direction on his starboard side, quickly lost speed over the ground, forcing 'K' to sail in parallel with her. Therefore, he increased his speed. At the same time, he recognized the freighter 'S' was nearing rapidly in an overtaking situation, while sounding one long blast on the whistle. Because the Kanmon Martis had given a warning against him to exercize caution on freighter 'S', he did not sound a warning signal believing that the freighter would reduce her speed so as to sail behind him.

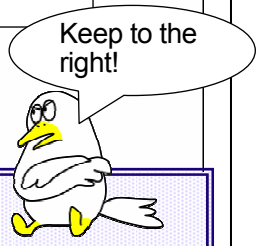
③ **(-)2 min.**
Although he recognized that the freighter 'S' had begun to take a sharp sheer to the starboard side, he was unable to take any action and collided with the freighter.



① **(-)7 min.**
Sailing at a speed of 9.6 knots over the ground. When his vessel had closed to a distance of 850 meters from the tanker 'K'—which was sailing on his starboard bow—and was attempting to overtake her, after swerving from the center to the port side of the passage, the master of the freighter received a warning in English, from the Kanmon Martis by VHF, to the effect that **"he should refrain from overtaking the tanker 'K'**," but he misunderstood the warning and did not respond to the call.

② **(-)4 min.**
He continued overtaking the tanker, sounding one long blast on the whistle, as a signal to attract attention.

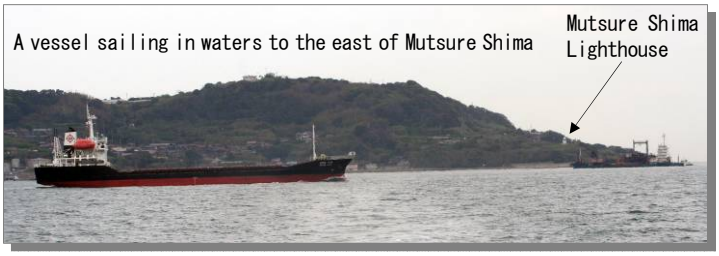
③ **(-)1 min.**
'S' took a rapid sheer to starboard, quickly closing to the tanker 'K'. The master put the helm to port—but to no avail, resulting in a collision with the tanker.



In the Kanmon Passage, keep to the starboard side of the passage!
In the vicinity of Moji Saki, never make a risky overtaking attempt!

- When sailing along the Kanmon Passage and Kanmon Passage 2, vessels are required to sail on the starboard side of the passage as far as is safe and practicable.
- In the Kanmon Passage, vessels are prohibited from making risky overtaking maneuvers or sailing parallel to another vessel. As demonstrated by this case, it is important to refrain from overtaking another vessel in narrow Hayatomo Seto with its tidal current.
- When sailing in Hayatomo Seto, mariners are required not to feel pressed, hurry, or fight the current, but keep a sufficient distance to another vessel ahead.

Western Section of Kanmon Kaikyo



In the western section of Kanmon Kaikyo, there are junctions of the Kanmon Passage—in the stretch from O seto (which makes a turn around the south end of Hiko Shima) to waters to the east of Mutsure Shima—with such passages as Sunatsu, Tobata, Wakamatsu Passage and Kanmon Passage 2, which fact requires navigation with considerable caution.

In waters to the east of Mutsure Shima, the Kanmon Passage was extended in length in 1996 and in width in 2002. However, the passage bends sharply in this area, making it difficult for larger vessels over 3,000 gross tons to maneuver. For this reason, the sailing route in the vicinity of the north entrance of the Kanmon Passage 2 has been dredged as a 10 year project since 2005.

Situation of marine accidents in the western section of Kanmon Kaikyo

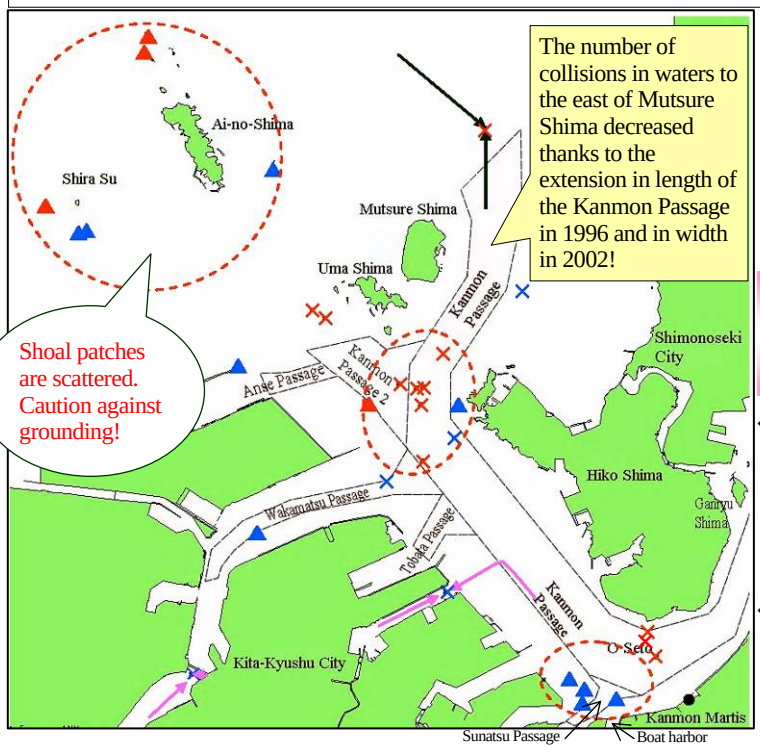
Among the marine accidents (collisions and groundings), involving passenger ships, freighters and oil tankers, for which judgments were delivered by the relevant marine accident inquiry agencies over a period of five years from 2002 to 2006, 16 collisions (32 vessels) and 14 groundings occurred in the Kanmon Passage and its adjacent waters, lying to the west of the longitude of Ganryu Shima.

By the location of the accident within the area, 2 collisions occurred in O seto; 4 groundings in waters adjacent to the Sunatsu Passage; 7 collisions and 2 groundings in the vicinity of the junction of the Kanmon Passage and Kanmon Passage 2; 6 groundings around Ai-no-Shima and Shirasu; and 7 collisions and 2 groundings in other waters.

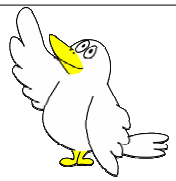
By the time bracket of the occurrence, 68% of the collisions and 64% of the groundings occurred between 2000 hours and 0600 hours.

Of the 16 collisions, foreign-flag vessels were involved in 11 cases! Accidents frequently occur in junctions of passages at night.

Collisions and groundings for which judgments were delivered over a period of 2002 to 2006 (marine accidents involving passenger ships, freighters and oil tankers)



× Collision involving a foreign-flag vessel (11 cases)
× Collision involving Japanese vessels only (5 cases)
▲ Grounding of a foreign-flag vessel (4 cases)
▲ Grounding of a Japanese vessel (10 cases)



● Cases of marine accidents in the vicinity of the junction of Kanmon Passage and Kanmon Passage 2

Vessels sailing along the Kanmon Passage have priority !

◆ In the Kanmon Passage, a 'small vessel' (i.e., 300 gross tons or less) as defined in the Port Regulations Law did not keep out of the way of another southward sailing vessel—which was neither a 'small nor miscellaneous vessel' (the latter also defined in the same law), resulting in a collision. (cf. Page 7)

◆ A westbound vessel intending to go out of the Kanmon Passage did not keep out of the way of another which was sailing southward along the same passage, resulting in a collision inside the Kanmon Passage 2.

◇ When a vessel intends to sail westward along the Kanmon Passage and goes out into the Kanmon Passage 2, she may encounter another vessel which is sailing southward in the junction of both passages. This area has dense traffic even at night and there may be times when such a vessel needs to keep out of the way of more than one other vessel. It is advisable for such a vessel to slacken her speed rather than taking avoiding action by steering alone!

● Cases of marine accidents in O Seto of the Kanmon Passage in the vicinity of the Sunatsu Passage

◆ A Japanese vessel which had come out of the Sunatsu Passage collided with a foreign-flag vessel sailing southeastward along the Kanmon Passage. (cf. Page 8)

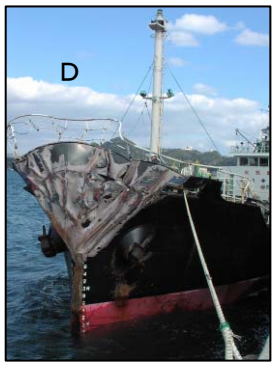
◆ A vessel entering the Sunatsu Passage from the Kanmon Passage went aground as she attempted to avoid an outbound vessel which had come from a nearby boat harbor.

(Case Study 3) A small Japanese oil tanker, which was a give-way vessel, collided with a foreign-flag freighter sailing southward along the Kanmon Passage

Summary

While sailing northwestward along the Kanmon Passage, the Japanese oil tanker 'D' detected the Panamanian freighter 'N' by radar. However, the tanker did not monitor the movement of the freighter nor did she heed the information about the freighter 'N' that the Kanmon Martis gave several times to the tanker by VHF.

On the other hand, when the freighter 'N' made a position report to the Kanmon Martis by VHF, upon entering the Kanmon Passage, she received information to the effect that she might approach a small westbound vessel. However, assuming that the westbound tanker would keep out of the way of the own vessel, the freighter continued sailing, without sounding warning signals, and they collided with each other.



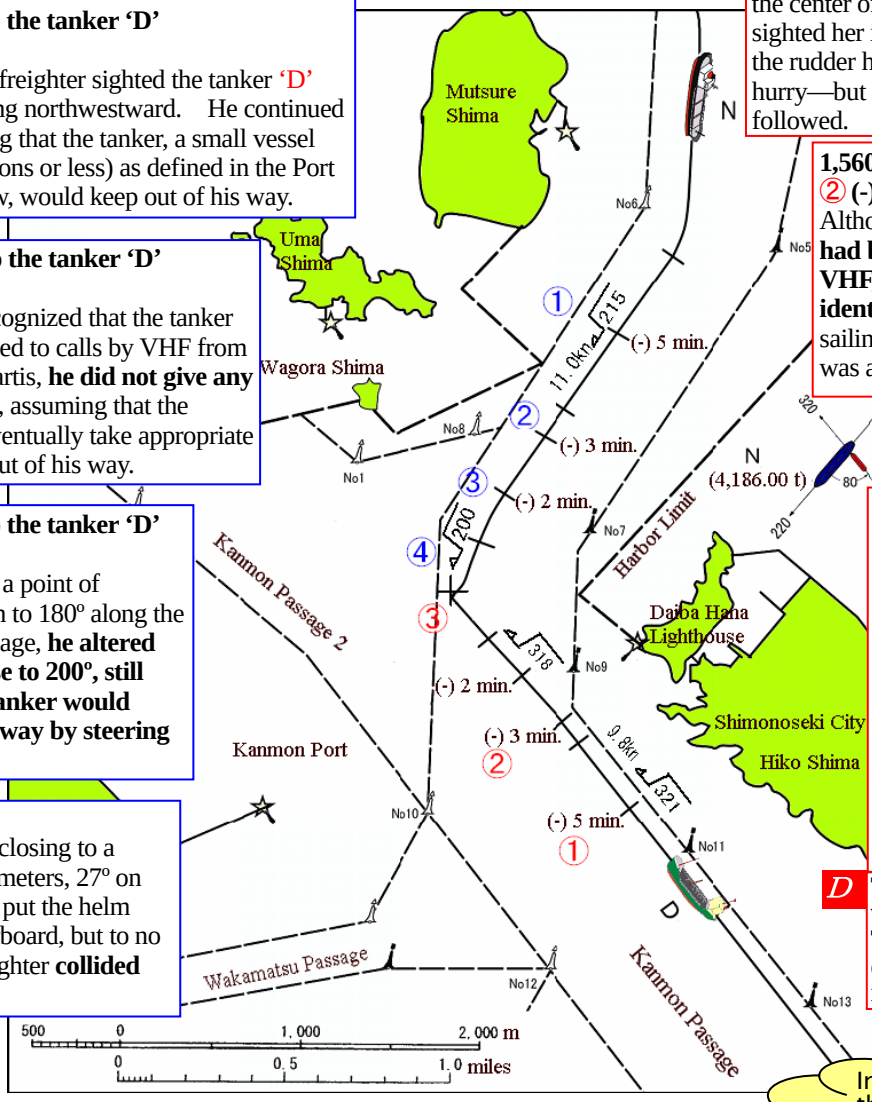
N **The master was conning under the guidance of a pilot.**

2,650 meters to the tanker 'D'
① (-)5 min.
The pilot of the freighter sighted the tanker 'D' which was sailing northwestward. He continued sailing, assuming that the tanker, a small vessel (i.e., 300 gross tons or less) as defined in the Port Regulations Law, would keep out of his way.

1,560 meters to the tanker 'D'
② (-)3 min.
Although he recognized that the tanker had not responded to calls by VHF from the Kanmon Martis, **he did not give any warning signal**, assuming that the tanker would eventually take appropriate action to keep out of his way.

1,000 meters to the tanker 'D'
③ (-)2 min.
Having reached a point of course-alteration to 180° along the bend of the passage, **he altered his vessel course to 200°, still assuming the tanker would keep out of his way by steering to starboard.**

④ (-)30 sec.
With the tanker closing to a distance of 270 meters, 27° on his port bow, he put the helm hard over to starboard, but to no avail. The freighter **collided** with the tanker.



③ Immediately before the collision
After observing the freighter closing to the center of the radar screen, he visually sighted her in close proximity. He put the rudder hard over to starboard in a hurry—but in vain. A **collision** followed.

1,560 meters to the freighter 'N'
② (-)3 min.
Although **the Kanmon Martis had been calling the tanker by VHF, without knowing her identity**, the boatswain continued sailing, unaware that the message was addressed to his vessel.

2,650 meters to the freighter 'N'
① (-)5 min.
The boatswain detected the freighter 'N' by radar. **He continued sailing, without monitoring the movement of the freighter, as he thought lightly that,** because of his slow speed against the adverse tidal current, **the freighter would pass ahead safely.**

D **The master of the tanker was resting.**
The boatswain was engaged in a single-handed navigation watch.

In Kanmon Kaikyo, the master should take the conn!!

Does the other vessel have the intention to keep out of my way or does she not?
Then, I will sound a warning signal !

Keep a listening watch on VHF Channel 16

In the highly dangerous environs of Kanmon Kaikyo, a vessel that does not keep a listening watch on VHF may adversely affect many of the other vessels around her.

If you have not turned up the VHF telephone to an audible level, it is as if the telephone is inoperative. You are required to ensure that you keep a listening watch, by checking the installed location and sound volume of the VHF.

(Case Study 4) A domestic tanker sailing out of the Sunatsu Passage collided with a foreign-flag freighter sailing southeastward along the Kanmon Passage

Summary

The tanker 'H', engaged in domestic trade for the carriage of fuel oil, which was not required to be furnished with international code flags, had the possibility, in the process of sailing out of the Sunatsu Passage, to encounter the Panamanian freighter 'S', which was sailing along the Kanmon Passage, but decided to cross the latter passage. On the other hand, the freighter, which was sailing southeastward along the Kanmon Passage, recognized the tanker entering the Kanmon Passage from the Sunatsu Passage. She continued sailing, while monitoring the movement of the tanker. Although the tanker did not show any signs of keeping out of her way, the freighter continued sailing, without sounding warning signals, and collided with the tanker.

③ (-)3.5 min.
Assuming the tanker, which was not displaying a destination signal, to be a vessel sailing in the same direction as his own, he put the rudder to port, slightly earlier than otherwise, to steer 112° along the orientation of O Seto No. 2 Leading light.

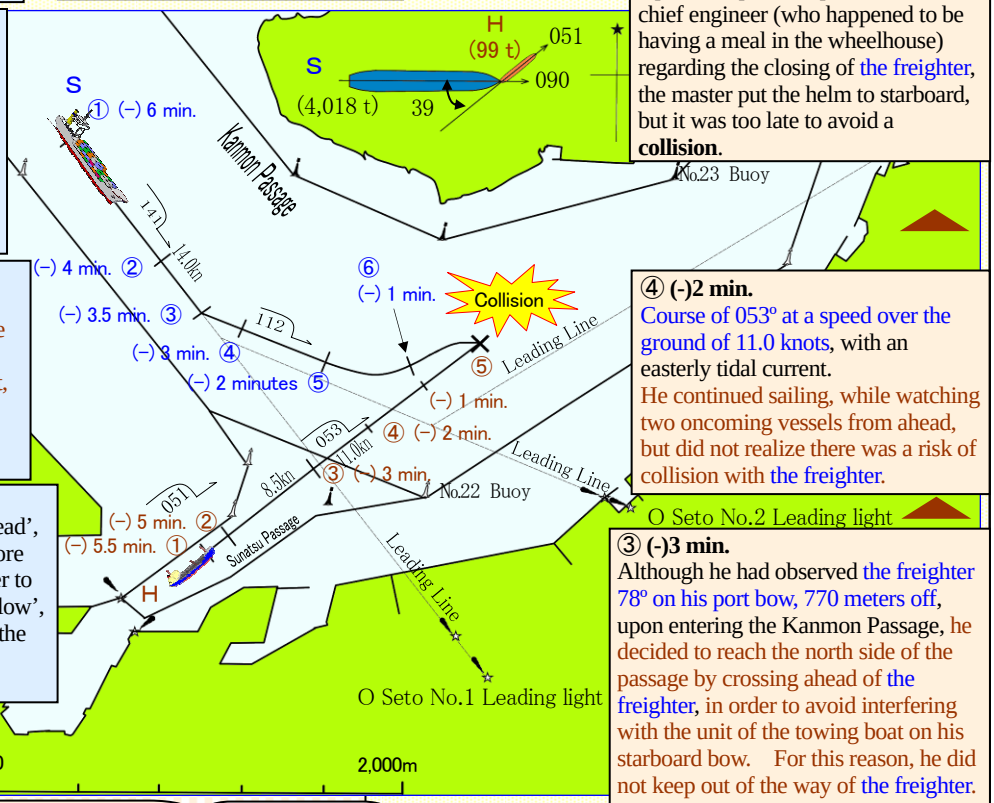
② (-)4 min.
The master initially sighted the tanker 'H' 18° on his starboard bow, 1,310 meters off, sailing out of the Sunatsu Passage. He continued sailing, while monitoring the movement of the tanker.

① (-)6 min.
Sailing on a course of 141°, at a speed of 14 knots.

The master was conning. S
The second mate was engaged in lookout and the operation of the telegraph.
The quartermaster was engaged in manual steering.

④ (-)3 min.
Although the tanker had continued closing, showing no sign of changing her course, he continued sailing, without sounding warning signals, on the assumption that the tanker would eventually alter to starboard, sooner or later, along the course of the Kanmon Passage.

⑤ Immediately before the collision
Upon receipt of a report from the chief engineer (who happened to be having a meal in the wheelhouse) regarding the closing of the freighter, the master put the helm to starboard, but it was too late to avoid a **collision**.



⑤ (-)2 min.
The tanker had closed in further, without changing her course, but he was prevented from making a large-angle course alteration to port, by an oncoming vessel on her port bow. He was therefore able to make only small change in course.

④ (-)2 min.
Course of 053° at a speed over the ground of 11.0 knots, with an easterly tidal current.
He continued sailing, while watching two oncoming vessels from ahead, but did not realize there was a risk of collision with the freighter.

⑥ (-)1 min.
He slackened her speed to 'half ahead', 'slow ahead' and, immediately before the collision, put the helm hard over to starboard and the engine to 'dead slow', but to no avail. 'S' **collided** with the tanker while she was still making a starboard turn.

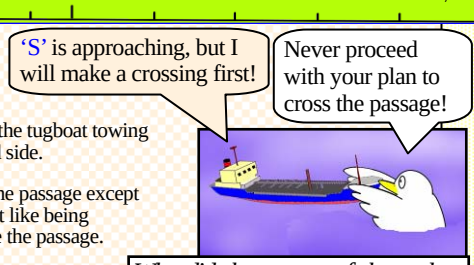
③ (-)3 min.
Although he had observed the freighter 78° on his port bow, 770 meters off, upon entering the Kanmon Passage, he decided to reach the north side of the passage by crossing ahead of the freighter, in order to avoid interfering with the unit of the towing boat on his starboard bow. For this reason, he did not keep out of the way of the freighter.

He did not want to sail on the starboard side of the passage because a few months earlier, he had witnessed a grounding of a domestic trade vessel outside of the starboard boundary of the passage.

He did not want to approach the tugboat towing a large barge on the starboard side.

He ordinarily sailed outside the passage except when crossing it. He did not like being overtaken when sailing inside the passage.

He assumed that the freighter would make a course alteration much later along the leading lines.



Why did the master of the tanker, who was familiar with transit through Kanmon Port, cause the accident?

② (-)5 min.
He first sighted a unit of towing boat and a tow 5° on his starboard bow, 700 meters off, and the freighter 'S' 70° on his port bow, 1,680 meters off.

① (-)5.5 min.
The tanker 'H' steamed on a course of 051° with 8.5 knots, heading to No. 23 Buoy, with the intention to cross the Kanmon Passage to her destination in Shimonoseki-ku.
The master was standing a single-handed navigation watch while being engaged in manual steering himself. H

Vessels sailing along the Kanmon Passage have right of way over other vessels ! (Specified sailing rules)
(Regulations for the Enforcement of the Port Regulations Law, Article 39, Paragraph 1, Subparagraph 7)

In Kanmon Port, in the event of a risk of encounter between a vessel sailing along the Kanmon Passage and another one sailing along another passage, such other vessel sailing along the other passage shall keep out of the vessel sailing along the Kanmon Passage.

The vessel intending to enter the Kanmon Passage from another passage should do so after ensuring that she has kept out of the way of other vessels sailing along the Kanmon Passage, by, e.g., slackening her speed in ample time.