Marine Accidents in Naka Suido (Channel) and Nishi Suido (Channel) of the Kurushima Kaikyo (Strait)

- Traffic Rules of the Kurushima Kaikyo (Strait) ........................................ 1 ~ 2
- Typical Marine Accidents in Naka Suido (Channel) and Nishi Suido (Channel) ...... 3
- Case Studies (Collision and Grounding) ......................................................... 4 ~ 8

There are a number of narrow channels in Japan called “Kaikyo”, “Seto” or “Suido”. Particularly in the Seto Naikai (the Inland Sea), there are 724 islands and the number of those would reach 3,000 if unnamed rocks are to be counted. The narrow and winding channels running between these islands are dangerous spots for navigation because of poor visibility and rapid tidal current. Significant casualties have occurred repeatedly in such straits as “Kurushima Kaikyo” and “Kanmon Kaikyo”, both of which are essential and busy passage routes through the Seto Naikai.

This issue features the situation of marine accidents in “Kurushima Kaikyo”.

Kurushima Kaikyo

“Maritime Traffic Safety Law” prescribes the traffic routes and traffic rules specific for the Kurushima Kaikyo. Particular attention must be given to a unique rule applicable for Naka Suido (the central channel) and Nishi Suido (the west channel), in which the traffic routes change their directions four times a day.

The particular pattern of maritime accidents which occur in this area is linked to this “Sail Naka Suido with the tidal current, Sail Nishi Suido against the tidal current” rule, as illustrated in the following examples.
What is the “Sail Naka Suido with the tidal current. Sail Nishi Suido against the tidal current” rule?

You must take the right lane during the northward current and take the left lane during the southward current in the Kurushima Kaikyo Traffic Route.

Don’t try to make a shortcut!

The rule must be observed by all vessels!

During navigational assistance by pilots

Kept distance from other vessels!

A significant number of foreign vessels are involved!

The collisions involving foreign vessels account for 8 cases (excluding vessels during navigational assistance by pilots) of the total (~18 cases). Some foreign vessels did not have any knowledge of the traffic rules applied to the Kurushima Kaikyo Traffic Route.

90% of the accidents have occurred at night!

Vessels which left Hanshin or Kyushu district in the evening, sailing west or east in the Seto Naikai, reach the Kurushima Kaikyo between 23:00-02:00. Therefore, the traffic through the Kurushima Kaikyo becomes busiest around midnight, making the occurrence of casualties concentrated at 01:00-02:00.

Total 41 vessels

Offshore vessels included in the 11 foreign vessels

Collision

Naka Suido (3 cases)

Nishi Suido (13 cases)

Grounding

Naka Suido (5 cases)

Nishi Suido (0 case)

Total 23 cases

Collision

Naka Suido (5 cases)

Nishi Suido (17 cases)

Grounding

Naka Suido (11 cases)

Nishi Suido (0 case)

Total 41 vessels

Maritime Traffic Safety Law (Law No.115, 1972)

Article 20.

When a vessel navigates the Kurushima Kaikyo Traffic Route along the course of such route, the vessel shall comply with any of the steering and sailing rules enumerated below. In such case, the provisions of Article 9 Paragraph 1 of the Law for Preventing Collisions at Sea shall not apply to a vessel navigating in compliance with any of these steering and sailing rules.

(1) To navigate the Kurushima Kaikyo Naka Suido (hereafter referred to as “Naka Suido”) with the tidal current and to navigate the Kurushima Kaikyo Nishi Suido (hereafter referred to as “Nishi Suido”) against the tidal current: Provided that, if there is a direction change of the tidal current while the vessel is navigating any of these channels, the vessel may continue to navigate the channel and that a vessel navigating Nishi Suido to enter the channel between O Shima and Hashihama or a vessel intending to enter from the same channel into the Kurushima Kaikyo Traffic Route and to navigate Nishi Suido, may navigate Nishi Suido even when navigating with the tidal current;

(2) To navigate as close as possible to Oh Shima and Oge Shima, when navigating via Naka Suido;

(3) To navigate as close as possible to Shikoku side, when navigating via Nishi Suido. In such case, a vessel having been navigating Nishi Suido and intending to enter the channel between O Shima and Hashihama or a vessel intending to enter from the same channel into the Kurushima Kaikyo Traffic Route and navigate Nishi Suido, shall keep to the Shikoku side of other vessels.

Occurrence of marine accidents classified by channels and tidal currents (1996- Aug., 2006)

23 cases

Collision

Naka Suido (5 cases)

Nishi Suido (17 cases)

Grounding

Naka Suido (11 cases)

Nishi Suido (0 case)

Total 41 vessels

Occurrence of marine accidents classified by time lapse from current change

Grounding

1

Collision

1

Total 23 cases

Current change

1hr

2hr

3hr

4hr

5hr

Occurrence of marine accidents classified by tonnage of vessels

Under 100t

100-200t

200-300t

300-500t

500-1,000t

1,000-3,000t

3,000-5,000t

5,000-10,000t

10,000t or over

Japanese vessels

Foreign vessels

Total 41 vessels

During navigational assistance by pilots

Occurrence of marine accidents classified by type of vessels

Passenger Ship

3 (17%)

Chemical Tanker

2 (10%)

including 1 foreign vessel

Fishing Vessel

2 (10%)
**Typical Marine Accidents in Naka Suido (Channel) and Nishi Suido (Channel)**

1. Collisions while overtaking other ships in the center of Nishi Suido during the southward current (Case 1 (page 4) and Case 2 (page 6))

   During the time-consuming sailing against the tidal current, it is very difficult to change the angle large enough to overtake other ships safely. Especially at night, it is hard to recognize minor course changes of other ships even if you watch their stern lights and the radar screen. The narrow passage makes the maneuvering of ships even harder.

   Your ship can be placed against your will in overtaking position with other ships, because of the complex tidal current and slow-down of other ships.

   All these factors contribute to the frequent occurrence of collisions at this specific point.

   You should watch the movements of ships ahead of you carefully, and keep ample distance from them.

   Do not try to overtake other ships in this channel.

2. Groundings on the south-east side of Uma Shima in the south entrance of Naka Suido during the northward current (Case 3 (page 7))

   A number of groundings have occurred at the south entrance of Naka Suido with the fair current. Main causes are the delay to turn starboard and drifting due to turning at a small angle.

   Operators should sail along the right (Oh Shima) side of the traffic route and order “Helm” (ex. Starboard 10°).

3. Collisions at the north entrance of Nishi Suido during the northward current

   While entering Nishi Suido from the west entrance of the Kurushima Kaikyo Traffic Route, and turning starboard at the north-east corner of O Shima, many ships have collided with others proceeding in the same direction. These collisions are attributed to lack of proper lookout for the ships on the starboard (Shikoku) side and also to making starboard turns. Operators should keep proper lookout on the movements of other vessels proceeding in the same direction while turning starboard.

**Point of Collisions or Groundings in the Last Decade (1996～Aug., 2006)**

- **Pay attention to starboard turns of other vessels proceeding in the same direction!**
- **Be careful of the sideslip due to the fair current! Don’t delay in changing the helm!**
- **Pay attention to the distance to other vessels proceeding in the same direction!**
- **A foreign vessel which navigated northward during the southward current against the traffic rule**
- **A foreign vessel which headed for Nishi Suido during the southward current**
- **A foreign vessel which grounded due to the delay of changing course for Nishi Suido during the northward current**

- **: Collision involving foreign vessels**
- **: Collision between Japanese vessels**
- **▲: Grounding of foreign vessel**
- **▲: Grounding of Japanese vessel**
Case 1: While four vessels proceeded northbound, a vessel overtaking another near Uma Shima collided

### The ship “S”
- Oil tanker (Register: Japan)
- G/T: 998 t
- LOA: 81 m
- Crew: 8
- Cargo: Heavy oil (2,008 kl)
- Mizushima Port, Okayama → Kannon Port

#### Master
- Age: 50
- License: Forth class (Deck)
- Experience at sea: 30 years
- Experience as master: 14 years

#### Boatswain
- Age: 63
- 2 months on board

### The ship “A”
- Container vessel (Register: Germany)
- G/T: 4,450 t
- LOA: 99 m
- Crew: 13 (Ukrainian: 4, Filipino: 9)
- Cargo: Container (1,069 t)
- Fukuyama Port, Hiroshima → Hiroshima Port
  (No pilot on board)

#### Master
- Ukrainian
- Age: 42
- Experience at sea: 24 years

#### Time and date of accident
- At 23:35 JST (UTC +9h) on May 12, 2005

#### Place of accident
- Kurushima Kaikyo Nishi Suido

#### Weather
- Fine, NW wind with force 1
- Tide: End term of flowing
- Current: 5.8 knots to south

### Summary
Four vessels were proceeding northbound in line in the Kurushima Kaikyo Nishi Suido at night. The 4th vessel “S”, after overtaking the 3rd vessel decided to overtake the 2nd vessel “A” by “A”’s starboard side, and changed the direction to starboard with reduced speed. Then “S” turned port slightly to avoid Uma Shima, and resulting in a close-quarters situation with the stern of “A”.

On the other hand, “A” was proceeding with reduced speed to keep distance from the preceding vessel, while keeping a look on the movement of “S” approaching from her starboard aft. Although “A” tried to attract the attention of “S” with the use of light signals, “A” eventually collided with “S”. “A” could not make port turn because of the preceding vessel close to her port fore.
Why did it happen!

The master of “S” engaged himself in steering by hand, so he could not leave the steering stand.

- No.2 Radar with ARPA was installed away from the steering stand.
- The master ordered the boatswain to steer by hand, but the boatswain did not follow the order, because he was not familiar with the Kurushima Kaikyo.
- The master further ordered the boatswain to take the steering stand and to operate following his instruction, but the boatswain did not follow it. So, the master had no other choice but to engage himself in steering by hand. Consequently, the master could not monitor the movement of other ships directly on radar.

A few temporary seamen dispatched from a manning company were always on board “S” to replace those on leave.

No special training or education had been provided by the owner for those newly employed temporary seamen.

The boatswain had been temporarily on board “S” for 2 months. But he was unable to steer by hand in the Kurushima Kaikyo and did not know where the whistle button was.

Crew must be trained and educated appropriately for specific voyages.

Steer by hand, please!

I cannot!
### Case 2: Collision in Nishi Suido while trying to pass through between two preceding vessels

#### **The ship “P”**
- Container vessel (Register: Panama)  
  - G/T: 4,393 t  
  - LOA: 114 m
- Crew: Container (1,691 t)  
  - Wakayama Shimotsu Port, Japan → Gwangyang Port, South Korea  
  - (No pilot on board)
- Master
  - South Korean  
  - Age: 61  
  - Experience at sea: 40 years
- Cargo: Container (1,691 t)
- Route: Wakayama Shimotsu Port, Japan → Gwangyang Port, South Korea (No pilot on board)

#### **The ship “G”**
- Chemical tanker (Register: Panama)  
  - G/T: 3,868 t  
  - LOA: 104 m
- Crew: 20 (South Korean: 10, Vietnamese: 10)
- Cargo: Styrene monomer (4,748 t)
- Route: Mizushima Port, Okayama, Japan → Kaohsiung Port, Taiwan (No pilot on board)

#### Summary

“The P” intended to pass through between two vessels while proceeding northward in the Kurushima Kaikyo Nishi Suido at night. 

“G” was on “P”’s starboard bow, and another vessel on “P”’s port bow was slow. “P” paid most attention to the slow vessel on the port side, and did not notice that the courses of “P” and “G” were in crossing position. Although “G” sighted “P” approaching from stern, “G” assumed that “P” would overtake “G” safely on her port side, and proceeded without giving warning signals. As a result, the two vessels collided.

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#### Keep listening to VHF ch16!

**Turn on VHF ch16 at all times to obtain information from Vessel Traffic Service (VTS) and to communicate with other vessels.**

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#### Keep an ample distance from other vessels in Nishi Suido!

Even when the radar vision is readily available, operators tend to rely on the actual sight of stern lights of preceding vessels to judge their movement. But it is very hard to measure the distance and predict the course precisely with the eye especially at night. In addition, the fast-flowing current against the ship in the narrow passage makes it tremendously difficult to maneuver the ship.

**You should never try unnecessary overtaking in Nishi Suido!  
Keeping ample distance is imperative here!**
**Case3: Grounding off the south-east coast of Uma Shima due to delay of changing course while proceeding northward for Naka Suido at 19 knots**

**The ship “S”**  Cargo vessel (Register: Japan)  G/T: 9,813 t   LOA: 167 m   Crew: 12
Cargo: Container(127), Chassis(63), Vehicle(93)  Osaka Port → (via Seto Naikai to shelter from typhoon) → Naha Port

**Master**  
Age: 49   License: First class (Deck)   Experience at sea: 16 years   Experience as master: 5 years

**Time and date of accident:** At 05:05 JST (UTC + 9h) on Oct. 20, 2004  
**Place of accident:** Off south-east coast of Uma Shima, Kurushima Kaikyo  
**Weather:** Rain, NNE wind with force 3  
**Tide:** Middle term of ebbing  
**Current:** 2.7 knots to north

**Summary**  
En route from Osaka Port to Naha Port, “S” intended to anchor for sheltering from a typhoon off Yashiro Shima, Yamaguchi, under the condition that typhoon No.23 was approaching the south coast of Shikoku. The vessel proceeded westward in the Seto Naikai (the Inland Sea) and reached the Kurushima Kaikyo. Receiving NNE wind on her starboard bow, “S” was proceeding with the fair current at almost full speed of 19.0 knots at the south entrance of Naka Suido, when the ship ran aground on shallows off the south-east coast of Uma Shima due to the delay of changing course.

**(-) 1.5 minutes**  
The master ordered her course 350° without ordering helm.  
The quarter master put helm to starboard.  
Helm at the max: 15°  
Started turning starboard slowly.

**(-) 2 minutes**  
“S” kept proceeding despite the timing of changing course. The master ordered the chief officer engaging in lookout of radar to inform the distance to south-east end of Uma Shima.

**(-) about 1 minute**  
The master ordered helm of hard-a-starboard.

**(-) 6 minutes**  
“S” kept proceeding while sighting Uzu Hana Lighthouse on a little starboard bow, although “S” deviated port about 200 m from planned course line when turning at planned point.

**(-) 7 minutes**  
Proceeded at almost full speed of 19 knots.

**(-) about 1 minute**  
The master ordered helm of hard-a-starboard.

**(-) 2 minutes**  
In response to the master’s request, the C/O answered only the distance to Uma Shima.

**Effective teamwork is indispensable for safe navigation!**

**Background***

1. The master lacked self-assurance, as it was his first navigation through the Kurushima Kaikyo.  
2. He was unfamiliar with the vessel, as he had been on board “S” for 8 days.  
3. He had previously been woking on board a ferry boat which was smaller (4,000 t) and had better maneuvering ability.  
4. He kept the speed of 19.0 knots because the departure had been delayed, and he needed to reach the sheltering spot promptly as the typhoon was approaching.

**Lessons to be learned***

1. He should have prepared and navigated more carefully as it was an unexperienced trip at night.  
2. He should have notified in advance other bridge members of the planned course line and the planned turning point.  
3. He should have ordered concretely the proper helm to take in the narrow channel.  
4. He should have given the master more detailed information obtained from the radar image, such as the deviation from the planned course line and the distance to the planned turning point.

1. In response to the master’s request, the C/O answered only the distance to Uma Shima.  
2. The Q/M followed the master’s instruction to turn starboard, but the helm, no more than 15°, was not enough to take the course of 350°.
Case 4: While proceeding southward in Naka Suido, an overtaking at the narrowest spot caused a collision

**The ship “I”**  Cargo vessel (Register: Japan)  G/T: 199 t  Registered Length: 42 m  Crew: 3  
Cargo: Magnesium hydroxide (340㎥)  Ube Port, Yamaguchi → Himeji Port, Hyogo

**Master**  
Age: 64  License: 3rd class (Deck)  Experience at sea: 48 years  Experience as master: 25 years

**The ship “O”**  Cargo vessel (Register: Philippine)  G/T: 7,416 t  LOA: 108 m  Crew: 18 (Filipino)  
Cargo: Plywood (4,168 t)  Kokura Section, Kammon Port → Takamatsu Port, Kagawa  (No pilot on board)

**Master**  
Age: 46  Filipino

**Time and date of accident:** At 01:00 JST (UTC +9h) on Dec. 15, 1999  
**Place of accident:** Kurushima Kaikyo Naka Suido  
**Weather:** Fine, no wind  
**Tide:** End term of flowing  
**Current:** 3 knots to south

**Summary**  
The two vessels, “I” and “O”, had recognized each other’s size, speed, and course beforehand. However, after entering Naka Suido, while concentrating on maneuvering the vessel in the narrow route, the existence of each other had slipped from their minds until they collided.

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**Bridge crew are fully occupied with forward lookout to maneuver the vessel!**

The Kurushima Kaikyo is congested with heavy traffic around midnight. Crew members are obliged to concentrate their attention on maneuvering the vessel in the narrow and winding routes. Therefore, they sometimes lack enough attention to recognize the movement of overtaking vessels.

Should you need to overtake other vessels, you must give the overtaking signal in order to notify them of your intention. The flashing light signal is also effective at night.

On the other hand, if you do not want other vessels to overtake you, you should give more than five short blasts to warn them.

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**Maritime Traffic Safety Law (Art. 6)**  
An overtaking vessel equipped with a whistle, shall, when intending to overtake any other vessel in a traffic route, give the whistle signal.