Summary of Chemical Tanker Accident at Kumano-nada, Japan

Mitsuyoshi NOMATA
Director,
Marine Environment Protection & Disaster Prevention Division, Guard & Rescue Department
Japan Coast Guard

Outline of the Accident

Time and date of accident: 04:05, July 15, 2005

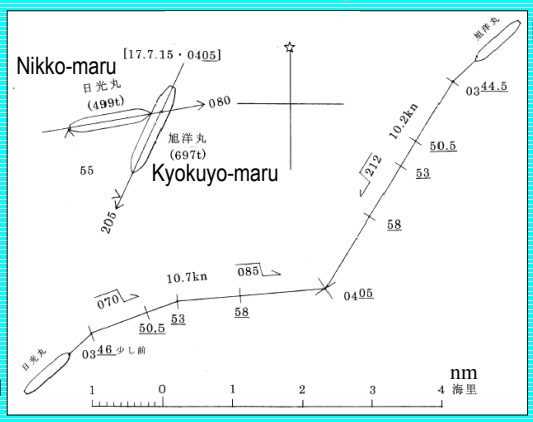
Location: 12.5 n-miles southeast off Mikisaki, Owase City, Mie Prefecture

Ship: Tanker "Kyokuyo-maru", 697GT, 7 crew onboard.

Cargo transported: Approximately 2,000-kl of Reformate
(Trade name: DM Reformate, mixture of Benzene, Toluene, Xylene, etc.)

Outline of accident: The Kyokuyo-maru and the chemical tanker "Nikko-maru" collided and a fire broke out on the Kyokuyo-maru. After the fire became under control, the Kyokuyo-maru sank on July 23. The following slides illustrate the Kyokuyo-maru from the time of collision to submergence.

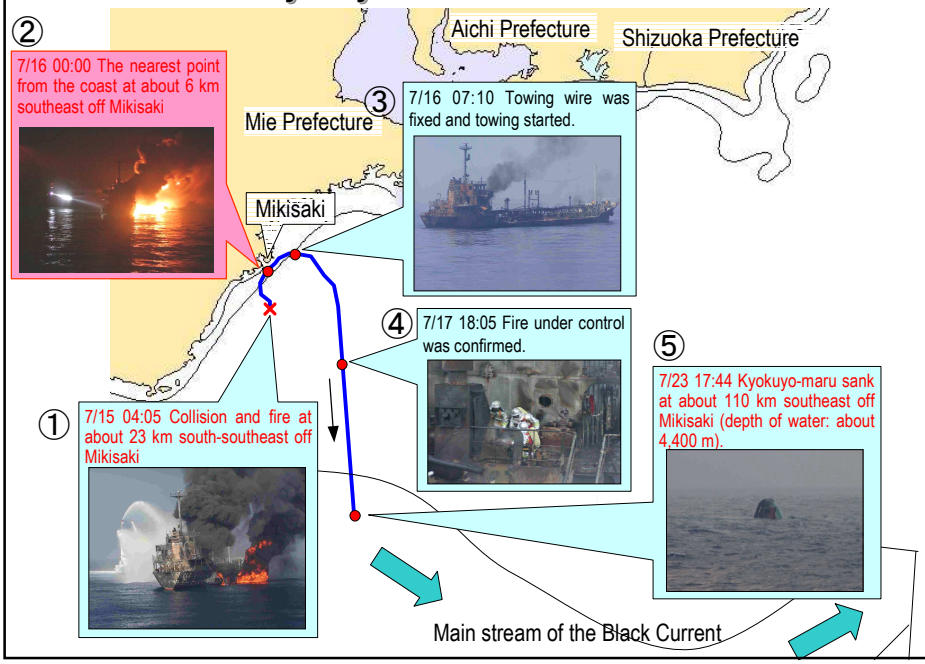
Geometrical relation of the two vessels when the collision took place

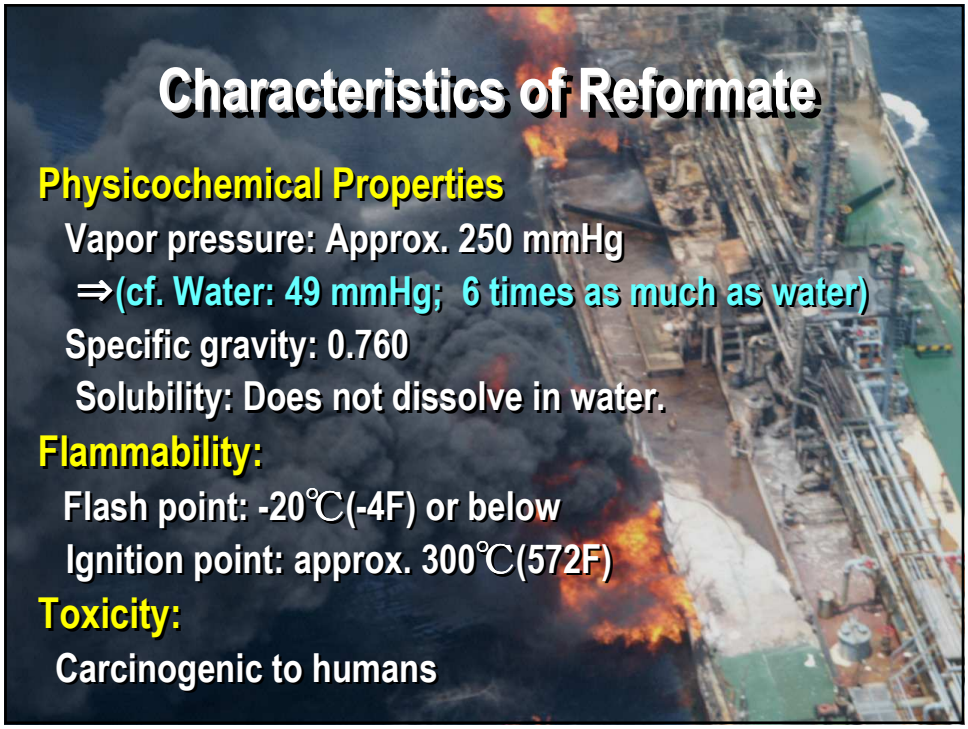


Source: http://www.mlit.go.jp/maia/03houdou/houdou19/190126yhr.pdf

- Nikko-maru's bow collided with Kyokuyo-maru's starboard-side bridge.
- 2 of the 7 crew members of Kyokuyo-maru jumped into the sea (one of them died).
- The remaining five were missing. → Search and rescue operation was undertaken at sea.→ A Special Rescue Team searched for them in the vessel before the fire was completely extinguished and discovered the remains of the five missing crew members.

Track chart of Kyokuyo-maru from collision to submersion




Characteristics of Reformate
Physicochemical Properties
Vapor pressure: Approx. 250 mmHg
⇒(cf. Water: 49 mmHg; 6 times as much as water)
Specific gravity: 0.760
Solubility: Does not dissolve in water.
Flammability:
Flash point: -20℃(-4F) or below
Ignition point: approx. 300℃(572F)
Toxicity:
Carcinogenic to humans


Section 1. Extinguishing the Ship Fire

Studies before fire-extinguishing was undertaken

① Identifying the dangerous area

② Evaluating the possibility of explosion

③ Fire-extinguishing method, etc.

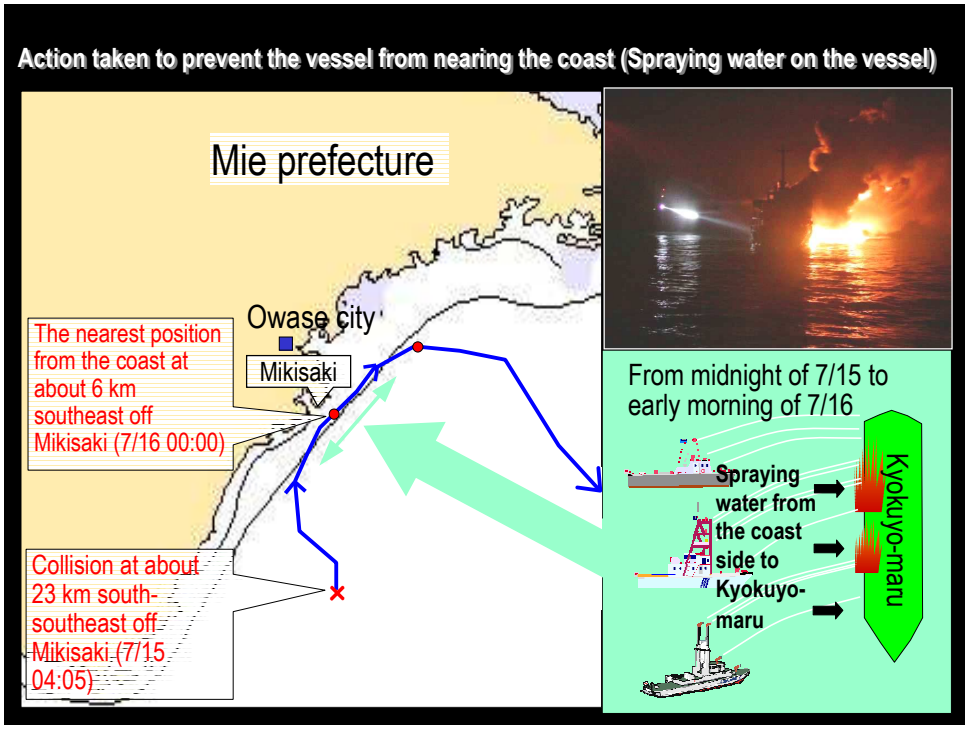
Fire-extinguishing strategy at the beginning (1st day)

① Spraying water for cooling down

② Spraying foam fire-extinguishing agent

③ Spraying powder fire-extinguishing agent

This picture: Fire-extinguishing drill


Action taken to prevent the vessel from nearing the coast (Spraying water on the vessel)
Mie prefecture
Owase city
Mikisaki
The nearest position from the coast at about 6 km southeast off Mikisaki (7/16 00:00)
Collision at about 23 km south-southeast off Mikisaki (7/15 04:05)
From midnight of 7/15 to early morning of 7/16
Spraying water from the coast side to Kyokuyo-maru
Kyokuyo-maru


Kyokuyo-maru in the fire just before leaving the position where the collision took place

Undertaking towing (2nd day)

04:30 The fire began to die down.

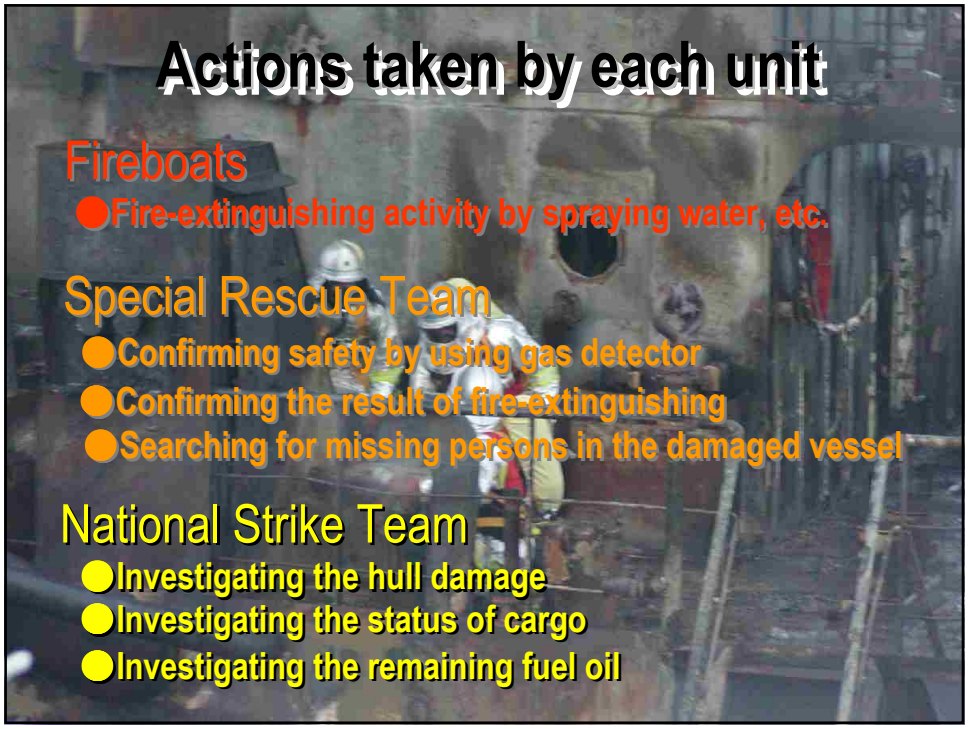
⇒Fixing a towing wire was discussed.

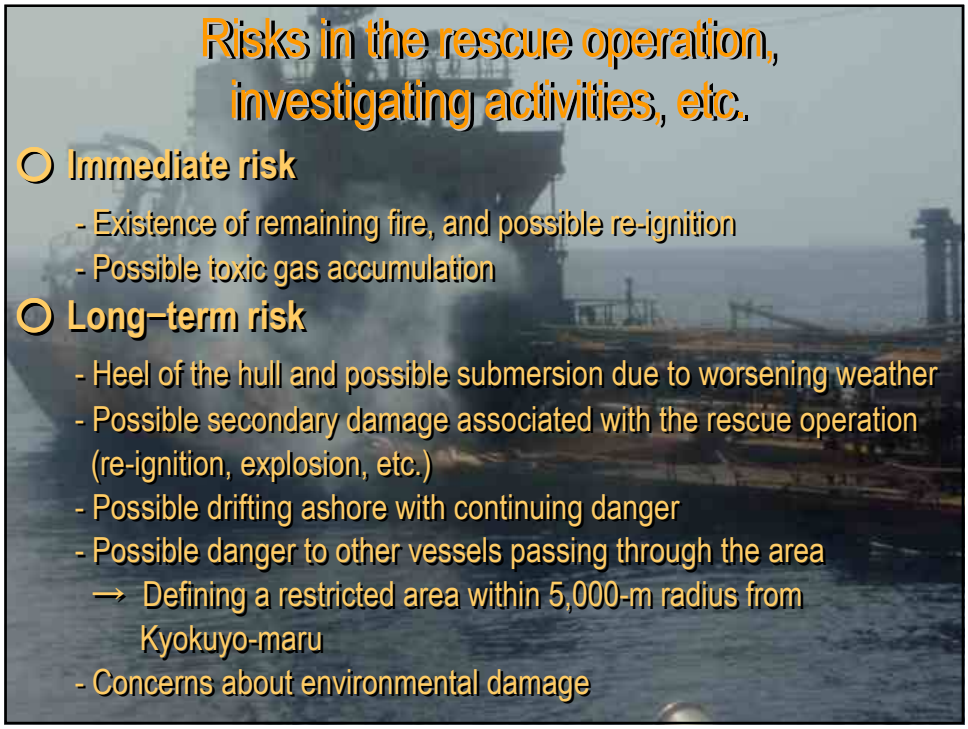
05:43 Special Rescue Team boarded the vessel and fixed the towing wire.

07:10 A patrol vessel started towing toward the open sea.

Fire-extinguishing was successfully undertaken again.

Section 2. Extinguishing the Fire, Confirming the Fire Extinguished, Investigating Remaining Oil, etc.


Actions taken by each unit
Fireboats
Fire-extinguishing activity by spraying water, etc.
Special Rescue Team
Confirming safety by using gas detector
Confirming the result of fire-extinguishing
Searching for missing persons in the damaged vessel
National Strike Team
Investigating the hull damage
Investigating the status of cargo
Investigating the remaining fuel oil


Risks in the rescue operation, investigating activities, etc.
Immediate risk
- Existence of remaining fire, and possible re-ignition
- Possible toxic gas accumulation
Long-term risk
- Heel of the hull and possible submersion due to worsening weather
- Possible secondary damage associated with the rescue operation (re-ignition, explosion, etc.)
- Possible drifting ashore with continuing danger
- Possible danger to other vessels passing through the area
→ Defining a restricted area within 5,000-m radius from Kyokuyo-maru
- Concerns about environmental damage

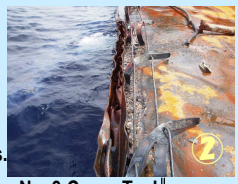
Results of investigating damage to the hull

C fuel oil tank

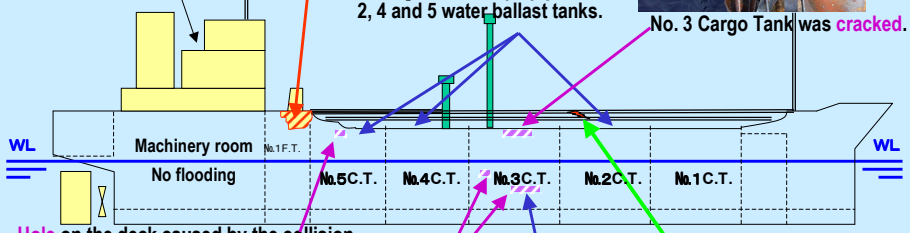
Crack

Accommodation space was burnt.

Flooding was observed from the damaged air-escape pipes at Nos. 2, 4 and 5 water ballast tanks.



No. 3 Cargo Tank was cracked.

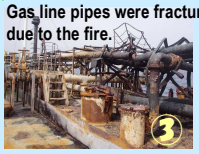


Hole on the deck caused by the collision at No.5 Cargo Tank (starboard)

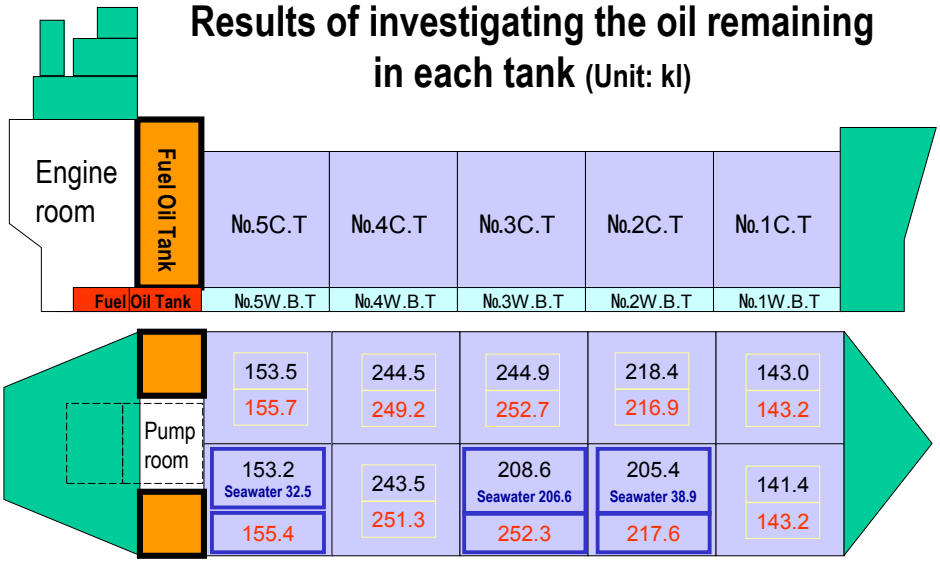
Hole

Underwater cracks
No.3 Cargo Tank (starboard) was almost filled with seawater.

Gas line pipes were fractured due to the fire.



Results of investigating the oil remaining in each tank (Unit: kl)



About 340 kl of cargo oil (about 1/6 of the total) was burnt or flowed away.

About 1,660 kl of hazardous and/or noxious substances remained.

Measured on 7/17

At the time of cargo loading

Section 3. Actions Taken on the Hull after the Fire Was Extinguished

Actions Taken on the Hull after the Fire Was Extinguished

- Joint investigation of the status of the hull structure by the National Strike Team, a salvage company, and specialists assigned by the ship owner

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- Possible re-ignition due to continued leakage of flammable gas from the cracks on the hull
- With 20-degree heel to the starboard side, risk of overturning and submergence increased

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Emergency repair and transshipment of cargo etc. were difficult.

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As a typhoon approached, towing was started off the coast on July 22 at the request of the ship owner.

On July 23, the Kyokuyo-maru sank while being towed (59 miles off the coast, depth of water: 4,400 m).

Section 4. Future Tasks to Be Discussed

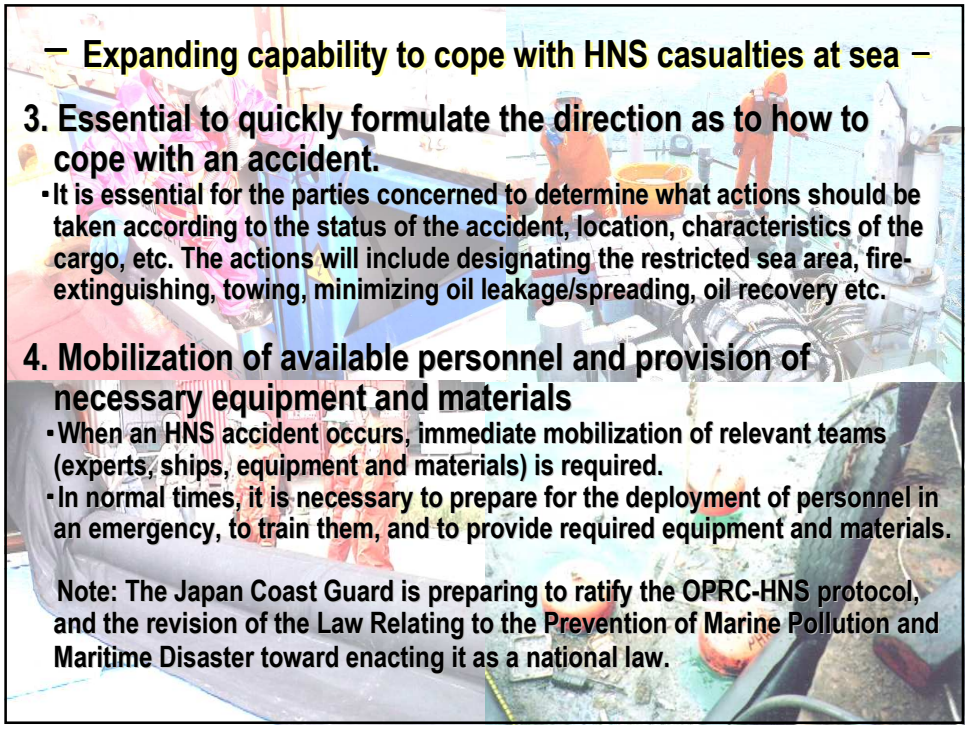
– Expanding the capability to cope with HNS casualties at sea

1. Quick identification of HNS on board

- If crew casualties have occurred, quickly identify the HNS with the cooperation of the ship owner, the operator, the shipper, etc.

2. Creation of HNS database

- It is important to establish a database including characteristics of HNS and how to handle them.



− Expanding capability to cope with HNS casualties at sea −

3. Essential to quickly formulate the direction as to how to cope with an accident.

- It is essential for the parties concerned to determine what actions should be taken according to the status of the accident, location, characteristics of the cargo, etc. The actions will include designating the restricted sea area, fire-extinguishing, towing, minimizing oil leakage/spreading, oil recovery etc.

4. Mobilization of available personnel and provision of necessary equipment and materials

- When an HNS accident occurs, immediate mobilization of relevant teams (experts, ships, equipment and materials) is required.
- In normal times, it is necessary to prepare for the deployment of personnel in an emergency, to train them, and to provide required equipment and materials.

Note: The Japan Coast Guard is preparing to ratify the OPRC-HNS protocol, and the revision of the Law Relating to the Prevention of Marine Pollution and Maritime Disaster toward enacting it as a national law.