

Maritime Risk Management Exercise Using E-mail Network

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ABSTRACT

There were maritime incidents with large scale oil spill which seriously damaged the maritime environment in the world. The incidents showed many complex problems to be solved, such as;

- Technology and hardware for rescue and for oil recovering,
- Compensation of the environmental damage,
- International regulation of substandard ships and Port State Control.

Inspired by that incident, we have been assessing the all countermeasures and applied procedures of the incident as one of the Risk Management researches in our university. Our research group prepares the model scenario of the marine incident with large oil spill. The simulation models of maritime incident is divided into three stages in the scenario with tasks from simple to complicated and carried out by students and staffs at the university by utilizing the national/international e-mail networks until the completion of the scenario.

In this paper, we would like to introduce our simulation exercise method with the following scenario of incidence. An oil tanker collides with a container at the mouth of Suez Canal and about 200 kls cargo oil are spilling out from the tanker. The spilled oil is drifting into the canal and influences the operation of vessel traffics of the canal. Participants play a role as a captain of taker, a captain of container, owners of theses ships, a canal master, commander of the coast guard, ships of oil recovering, tugboat company, city mayor, oil fence operator, a headquarter of the incident, media etc. These participants have to solve this oil spill incident through the e-mail net. The exercise starts from the first collision report from the tanker captain to the canal master or the coast guard through the e-mail. Then the participants as their role have to solve the incidents on the LAN.

1. Introduction

Last twenty years we had many maritime incidents involving cargo oil leakage from oil tankers e.g. 'Exxon Valdez' in Alaska and Prestige in Bay of Biscay. They seriously polluted various environments on shore and in harbors.

These incidents would not occur if the tankers were operated under normal conditions, such as well trained emergency manners, well maintained hull, machinery and instruments.

After the earthquake of Hanshin and Awaji in Japan in 1995 which had 6200 victims, a research group of Kobe University of Mercantile Marine (*hereafter KUMM*) performed a study on the optimum countermeasure against the large-scale hazards, e.g. earthquake, eruption and tsunami or industrial hazards. One of the basic subjects was related to technology and society, especially on risk management for the present society, which is supported and constructed by technological systems.

As the implementation of this group's program, after the incidents of 'M/V Nakhodka' of overage Russian oil tanker in Japan Sea¹⁾ and 'Diamond Grace' of VLCC in Tokyo Bay, the central and local governmental sectors and academic societies delivered an investigation on the reasons and countermeasure of the incidents. The research group has also proposed a modification on the present incident prevention system, in conjunction with proposition of the reinforcement scheme on the hazard prevention organizations.

2. Maritime Risk Management System

The marine hazard research group of the KUMM has been studying on the prevention manners and contingency measures system in maritime large-scale oil spill. Concurrently, hazards of industrial and natural cases have also been investigated¹⁻⁵⁾.

Each country has own measure organization for the hazards include maritime incidents such as FEMA in USA. Once a maritime incident occurs, the procedure to build up and the involved measure organization in Japan is shown in Fig.1.

First, the ship reports to the ship owner and the nearest coast guard office about the incident. The nearest coast guard office sets up a measure headquarter according to the size, characteristics and urgency of the incidents. The headquarter immediately determine the operation based on the data of incidents.

The urgent and sever operation is carried out by the Maritime Disaster Prevention Center include the direction of the commandant of the Japan Coast Guard.

The normal operation is carried out by the measure headquarter under the commission of the ship owner and others. The measures to prevent maritime disasters might be carried out by a systematic method. However, on the real operation, it fully depends on the disaster scale, geographical features, persons from various sectors, who in charge on the process.

3. Role Playing Simulation of the Oil Spill Incident

3.1 Outline of the Simulation

After the incidents of 'M/V Nakhodka' of overage Russian oil tanker in Japan Sea, the research group of the KUMM has been developing the basic simulation model using the e-mail of the Local Net Work system.

Participants play a role model as a captain of incident ship, ship owner, a director of coast guard, a mayor of the city, a chief of Maritime Disaster Prevention Centre and so on. In this simulation they must cope with the consequences and challenges of the incidents in a certain

period e.g. a week. They have to solve, analyze and find the solutions of the incident with spill oil, by simulating their position along with their duties and responsibility. They have an experience all process from sailing out to the compensation for the environmental damage by using their personal computer.

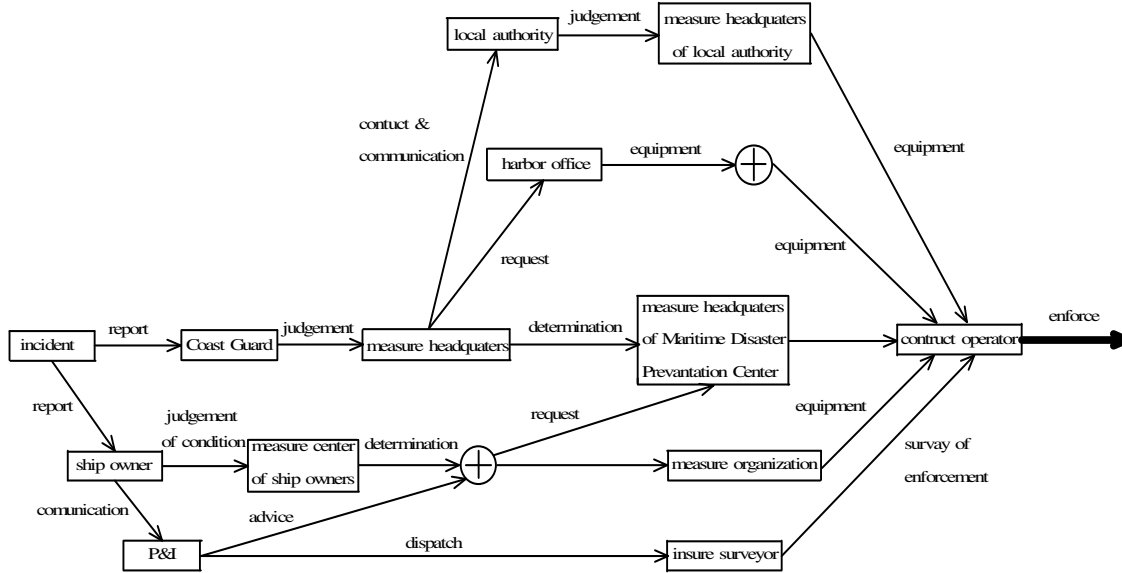


Figure 1: Structural process of the initial organization for large oil spill

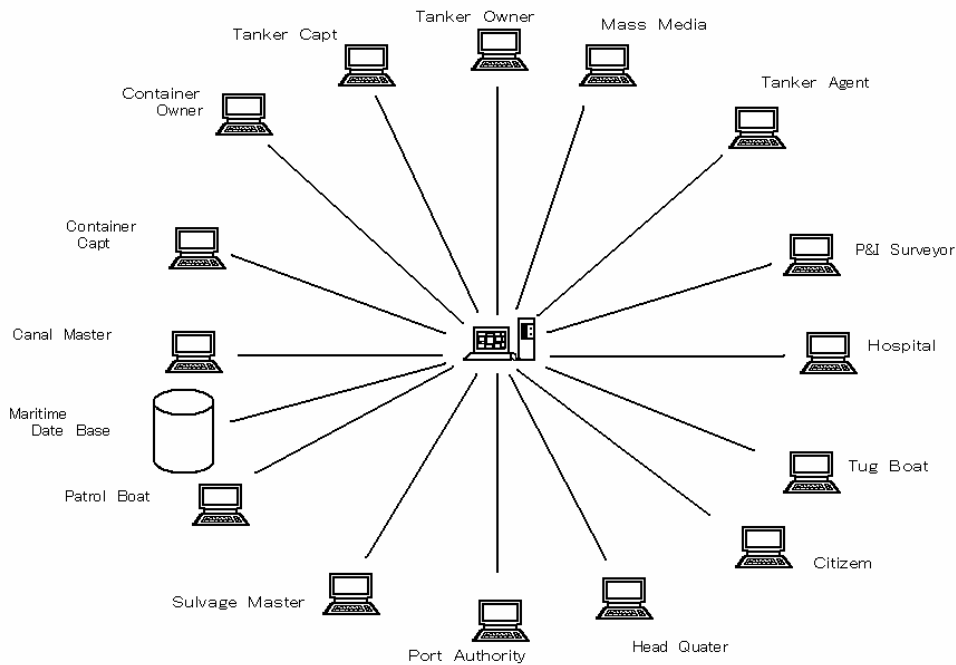


Figure 2: E-mail system of the simulation

3.2. Internet E-mail System on the Simulation Model

The e-mail system of the simulation model is shown in Fig.2. Every participant has a role and provided with one PC as well as their e-mail address. Usually the participants are divided into six groups include one or two teachers as the advisers. The advisers can read all dispatched and received mail within the group.

Since the LAN is connected to the database outside or inside the university, the participant can access the database for gaining the relevant materials easily.

During the participants are coping with the incident in the imaginary experience, they will be able to configure the process and system of measures as well as enforcement, prevention system and laws. Moreover, they will also be able to determine the required machinery, hardware, logistic system of the prevent material. They are also directed to compare and consider the simulation that they have done with the present prevention system and regulation.

Since 1997 this simulation exercises with various scenarios have been done at least once a year, all participants have to report and present the results of their roles before the all participants at the debriefing. Majority of them reported their improvement and understanding about the process or system of the rescue, support, fire protection, spilled oil recovery, salvage so on.

4. Scenario Frame of an Incident at the Entrance of the Suez Canal

4.1. Model Incident of Simulation

A scenario frame is composed the following conditions before starting the simulation exercise. All participants are cast as a role of simulation exercise, the casts are shown in the Table 1. They have to solve the scenario of maritime incident.

“On September 30, the visibility near designated anchorage at the entering the East Channel and the entering Port Said is very restricted by heavy shower around 06:00 o'clock. The Aegean Blue of Liberian flag oil tanker was approaching the Hm 135 of the East Channel from Anchorage V1. The Kobe-Maru of Panamanian flag container ship was dragging anchor from the Anchorage c3. The Kobe-Maru collided with the Aegean Blue at 0.5 mile east off the Port Said Fairway Buoy. The position of collision is shown on Fig.3. Just after the collision, both ships sent 'MAYDAY' calls through VHF Ch 16 to the Harbour Office. The present condition is; about 200 kls of C oil from the Kobe-Maru is leaking and drifting toward the entrance of Port Said. All westbound ships in the canal stop and can not move.”

The simulation exercise need about 30 students of graduated or under graduate from all courses of a Maritime Education Institution took part as the participants, without prior information about the incidents or training, except operating knowledge of the internet system.

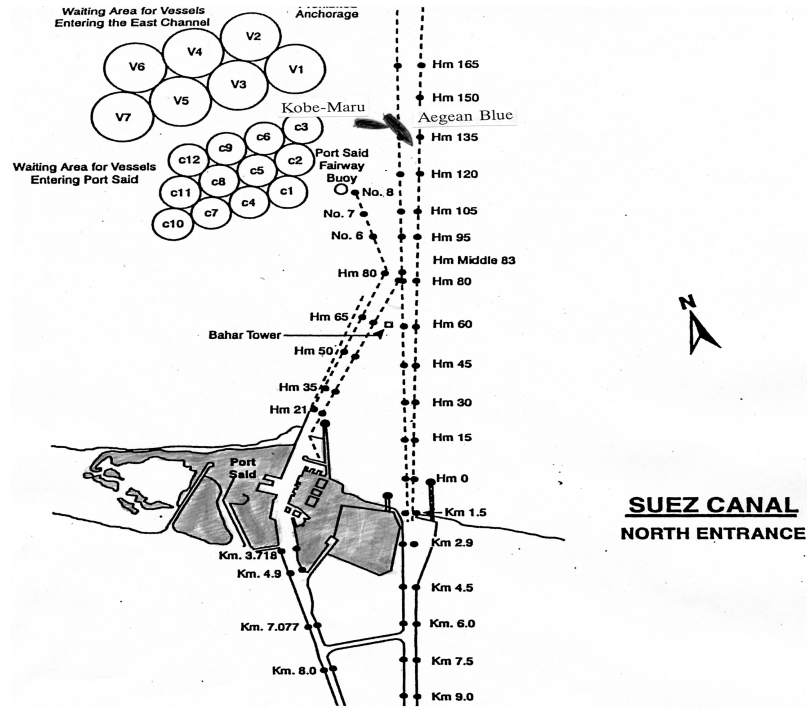


Figure 3: Position of the Collision⁷⁻⁸⁾

4.2. Roles of the Participants

The roles are allocated in Table 1. Each person of the six groups plays role to cope with the incident according to their duty and responsibility. For instance, the Maritime Authority of Port Said in Group 2, plays role to rescue the casualties and prevents/recovers the spilled oil. The Maritime Disaster Prevention Center of Group 3 prevents oil spill from the ship, recovers spilled oil and disposes the recovered oil. The advisers of the groups assist the participants.

Table 1: Simulation role

Group 1	Captains of the tanker and container, Ship owners / agents.
Group 2	Head and staff of the Suez Canal Authority at Port Said / Suez, Captain of the patrol boat, Head of Coast Guard, Patrol boat.
Group 3	Head of the Maritime Disaster Prevention Center, President of the salvage company, Captain of the salvage / tug boat.
Group 4	Governor of the district, Hospital, Fire brigade, Group of Fishermen, Police, Police, Citizen.
Group 5	Representative of the ship owner, P & I club surveyor.
Group 6	Minister of Environmental Agency, Mass media, Volunteers.
H.Q	Internal / External academic staff as the advisers for each group.

The headquarter of the simulation system can check all mails and control the processing time and progress of the scenarios.

4.3. Task of the Simulation

4.3.1 The Initiation of Exercise

The second report from Kobe-Maru ships is follows;

“The bow of the container collided with the starboard side tank and C-oil is spilling out from the tankers. The weather and visibility near the site are recovering; the tide at the site is 1.0 knot to SE. Both ships are drifting together. The damage of both ship are being examined”.

The scenario of the simulation exercise is consisted of three stages:

The first stage, an oil tanker collides with a container ship and causes discharge of oil in the entrance/exit of the very important canal for the world wide marine transportation. The spilled oil spreads larger area and pollutes the Port Said Fairway Buoy area. The Suez Canal Authority has to control and conduct all ships in the canal.

The participants who role as the Suez Canal Authority, Coast Guard, Marine Disaster Prevention Center, salvage engineers and cope with rescuing the casualties and ships, prevent oil leakage and recovered the spilled oil.

Simulation time will last two days.

The second stage, accomplishes parallel to the first stage. The combating measures are changed from the first operation to the second operation under the commission of the ship owner and others. The spilled oil drifts to the beaches of Port Said/Port Fouad, Port Said By-pass and Lake Mezala. The local government includes the fire brigade and police, volunteers, fisherman and dockers struggle to prevent, recover and dispose the drifting oil near on the coastline. The Suez Canal Authority at sides of Suez and Port Said are directing the traffic control through VHF. The tanker and container will be towed to the free space for repairing.

Simulation time will last one day.

The third stage, after clean up the spilled oil in the fairway of Port Said area, the traffics in the canal are normalized by The Suez Canal Authority. The local government include the Authority and affected sectors figure up the amount of measures and compensation of the damages. P&I Club surveyors assess the environmental damage and check all claims from the local government include the Authority and affected sectors. Simulation time will last two days.

5. Conclusion

This paper is an introduction of the simulation method and procedure for the maritime risk management exercise using e-mail network. There are many training applications with various scenarios such as collision with fire or flood, foundering and grounding, earthquake, eruption, tsunami, industrial incidents so on⁶⁾.

The scenario of this paper is an imaginary maritime incident at the entrance of the Suez Canal.

From the results of our performances since 1997, the participants showed very similar processes of judgment, determination of rescue, prevention and recovery of the spilled oil to the incidents of 'M/V Nakhodka' in Japan Sea and 'Diamond Grace' in Tokyo Bay.

The trial at the KUMM is still in the process of refinement in terms of scenario models, methodology, communication tools and the Internet accesses. However, this gives experience and general knowledge in anticipating any kind of hazards. This kind of trials is very effective and valid to educate and train the participants who have not had experience and general of any kind of hazards including, earthquakes, volcanic eruption, marine hazard, industrial incidents and emergency manual of companies in the short period.

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