

Tackling the Difficulties of Marine Oil Spill Incidents: Dual Aspect of Safety and Management

Takahiro Hagihara Director, Operations Division Maritime Disaster Prevention Center (MDPC)



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Maritime Disaster Prevention Center

The MDPC mission

We provide education and training in worldstandard on-site tactics, methods for managing operations of an accident response headquarters, and other matters, for those with concerns about incident or disaster response and training.





- We provide timely and effective disaster response activities in case of an incident or disaster befalling handlers of hazardous materials, whether on sea, coastline, or on-shore, both in Japan and abroad.
- As representative of the parties responsible for fires, leaks, or other incidents, we are the only group in Japan with experience in more than 170 disasters in the 41 years since our founding.

A crisis management solutions company



The three Operational Capabilities of the MDPC

Safety measures capability

Confirming and establishing safety on the site of an incident involving toxic or hazardous materials





Firefighting capability

Firefighting activities and eliminating the fire source on the site of an explosion or fire



Cleanup capability

Detoxification and removal of oil and other contaminants on the site of pollution





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Types of incidents assumed and aims: What you are asked to envision

Cause

Simultaneous large-scale marine pollution incidents at coastal petrochemical complexes, which may occur in case of a major earthquake directly under Tokyo Metropolitan area or along the Nankai-Tonankai trough

Source

Response to mixed pollutants when multiple polluters (facilities, ships, etc.) spill a mixture of black oil, clean oil, and chemicals (assumed to be like crude oil)

Focus

Taking safety measures as initial response to a large-scale oil spill accident, and operation of a mixed-team accident response headquarters, treating mixed pollutants as equivalent to crude oil

Aims

For future reference applicable to operation and management of not only individual small-scale oil spills but also incidents involving various pollutants, treat mixed pollutants of black/clean oil and chemicals from simultaneous leaks as equivalent to crude oil leaks





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Fixed-point measurement of atmospheric environment in Edogawa Ward, Tokyo Recording of non-methane (car exhaust gas, etc.) concentrations*



*Total hydrocarbons = CH_4 + Non-methane hydrocarbons



Example of fire and explosion on oil tanker accident in port

Crude oil vapor near the ship hull leeward shield ignited and exploded

- O Overview of *Heim Vard* tanker 35,000 GT, length 236 m, Norwegian registry
- O Outbreake of incident/casualty Occurred May 23, 1965 in the Muroran Port, Hokkaido

Deaths: 8 crew members of *Heim Vard*, 2 on a hawser boat

O Weather conditions Fair, westerly winds 3 to 4 m/s



ignited near the bridge, causing







Dual aspect of on-site safety

Safety in ordinary times

Work environment management is regulated from the standpoint of occupational safety and health.

Safety in an emergency

Japan does not have regulations regarding standards or guidelines for work environment safety applicable to work at sites of accidents (emergencies), such as fires or spills of oil or hazardous materials, or at contaminated sites.





Dual aspect of on-site safety

What

S

safety?

[Safety in ordinary times] The standpoint of occupational health and safety

Safety in a work environment with long working hours **Work environment**

measurement

Permissible concentration (8 hours/day, 5 days/week) Dust mask Gas mask Chemical protective clothing Preventing fire and explosion

[Safety in an emergency] Safety of on-site workers

The minimum level of safety necessary when taking emergency measures **Work environment detection** Standards for concentration of substances in an emergency situation

1 hour; 30 minutes;

- 15 minutes
- Personal protective
- equipment
- Spill cleanup
- Zoning Hot; warm; cold



Safe distance setting: Examples of guides for concentration

- ERPG 3: The maximum atmospheric concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.
- ERPG 2: The maximum atmospheric concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.
- ERPG 1: The maximum atmospheric concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

Notes:

*ERPG: Emergency Response Planning Guidelines;

levels set by the American Industrial Hygiene Association.

*TLV-TWA: Threshold limit value-time-weighted average (permissible concentration); the concentration for a conventional 8-hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, for a working lifetime without adverse effect.

Benzene 10 t 5 m/s

Simulation by ALOH

Note: Below is only a rough guideline; the important thing is to have in mind the distance from the site.





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Incident management and issue management

The MDPC has

> a wealth of experience (failures and successes) on the front lines of incident sites (perspective of disaster site), and

> operations methodology specific to each site

(perspective of accident response headquarters).

Crisis management can therefore be conceptualized as follows:

Crisis Management=Incident Management+Issue Management

Issue management (accident response headquarters)

- > Dealing with media, government, head office, etc.
- Dealing with many different issues and requests from the incident site
- Providing operations, planning, logistics, and finance/administration functions

Incident management (incident site)

- The specific response procedures differ with each incident
- The bad effects of repeated drills conducted as mere formalities
- Divergence from world-standard tactics
- Acting only after waiting for instructions (command-centered crisis management)



Examples of Incident Command System (ICS) modular organization structure for responding to simultaneous marine pollution incidents







Functions required by accident response headquarters

The functions for dealing with matters

in both ordinary times and emergencies follow a similar approach



- 1. Operations functions The Doers Functions for responding to incidents Examples: Firefighting activities by private firefighting (fire prevention) organization, and procedures for safe shutdown of factory function.
- 2. Planning functions **The Thinkers** Functions for planning short-, medium-, and long-term responses

Examples: Determining the situation and sharing information to formulate an incident action plan (IAP), the key leading to effective business continuity planning.

- 3. Logistics functions **The Getters** Functions supporting all activities Examples: Obtaining the personnel, equipment, and materials for carrying out the IAP; human resource management.
- 4. Finance/administration functions

The Payers

General affairs functions for contracts, payment of fees, and public relations

Examples: Purchase contracts and payment for equipment and materials; internal and external public relations.



14 Rules of ICS



- 1. Common terminology
- 2. Transfer of command
- 3. Chain of command and unity of command
- 4. Unified command
- 5. Management by objectives
- 6. Incident action plan
- 7. Modular organization
- 8. Management span of control
- 9. Integrated facilities management
- 10. Comprehensive resource management
- **11. Integrated communications**
- **12. Information and intelligence management**
- 13. Accountability
- 14. Dispatch/deployment

Formulation of incident action plan (IAP)



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The "P" of planning

An IAP plays an important role in dealing with incidents in the medium to long term.

The IAP is prepared by the Incident Command Post and approved by the Unified Area Command.

Each section conducts planning, forecasting coming changes in the situation, confirming the available or obtainable resources, devising strategy, and carrying out tactical operations.

The rational processes for drawing up an IAP are the "P" of planning. Preserved as evidence in case of a legal battle.



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ICS Cloud service

⇒ "Rule book" stipulating the 14 main rules
 ⇒ Introduced and put in practice by the MDPC

at accident sites for more than 10 years \Rightarrow Manual detailing cumulative failures and successes

Cloud-based crisis management pilot system

Today there are many information sharing tools and systems, but the ICS Cloud is a "pilot" for operations management of an accident response headquarters, following world-standard rules. The system provides guidance from prompt initial response to business continuity, by assisting with emergency response implementation and response/recovery planning while helping to manage resources and attendance of disaster prevention personnel, etc.



Features (1) Information sharing

O Information about the incident, the on-site situation, response situation, and other information can be shared with all parties concerned.



http://www.mdpc.or.jp/



Features (2) Modularization of organization and personnel management

O By setting the necessary organizations (teams, groups, units, etc.) of the necessary scale in the necessary departments/divisions based on the incident status, flexible response can be made to various incidents.





Features (3) Preparing incident action plan (IAP)



O An IAP can be prepared based on ICS rules and shared with all parties concerned.

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Features (4) Resource management and cost calculation

O Thanks to unified management of assembled resources (personnel, ships, equipment and materials, etc.), cleanup activities can be carried out effectively and efficiently. O The costs of emergency response activities can be calculated quickly.

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MDPC-ICS System Features (5) Creation of pages for public release





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