HNS – Practical Aspects
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Maritime Business Forum, 8th December 2010

Introduction to ITOPF

- Established in 1968 following TORREY CANYON
- Technical advisory role began in early 1970's
- Operates as a non-profit making organisation
- Primarily funded by the shipping industry (via P&I Clubs)
- Main role: objective advice on marine spills of oil & HNS
- Main aim: 1st source of advice for maritime industry
- Based in London but provides a global service
Role of ITOPF

- Promote effective, technically sound & reasonable response
- Liaise with government agencies, spill responders & victims
- Aim to facilitate cooperation & mutual agreement
- Assist with securing equipment & organising clean-up
- Monitor spill response & investigate damage to resources
- Help to design & implement post-spill studies / restoration
- Offer guidance to claimants on preparation of claims and technical assessment of claims for P&I clubs/shipowners

Introduction to ITOPF

ITOPF HNS Working Group

- To keep ITOPF staff up to date with HNS issues
- Follow-up on the international regime developments
- Attendance to the IMO OPRC-HNS Technical Group
- Follow-up on operational developments (monitoring & response)
- In-house exercises
- Provide training (OPRC-HNS)
- Response to marine HNS spills / NCEC Carechem agreement

Introduction to ITOPF
<table>
<thead>
<tr>
<th>Date</th>
<th>Name of Ship</th>
<th>Location</th>
<th>Cargo</th>
<th>Type of Vessel</th>
<th>Fate &amp; Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>31/10/2000</td>
<td>IEVOLI SUN</td>
<td>France</td>
<td>Styrène Isopropylic alcohol Methyl ethyl ketone</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator / Polymerizer Floater / Dissolver Floater / Evaporator / Dissolver</td>
</tr>
<tr>
<td>10/09/2002</td>
<td>JOLLY RUBINO</td>
<td>S. Africa</td>
<td>Class 3 hazard</td>
<td>Ro-ro</td>
<td>Flammable liquids</td>
</tr>
<tr>
<td>18/10/2002</td>
<td>ACCORD</td>
<td>China</td>
<td>Poly-glycol mono-methyl ether acetate Methyl methacrylate</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator / Dissolver Floater / Evaporator / Polymerizer</td>
</tr>
<tr>
<td>31/05/2003</td>
<td>FU SHAN HAI</td>
<td>Denmark</td>
<td>Potash (KCl)</td>
<td>Bulk carrier</td>
<td>Sinker / Dissolver</td>
</tr>
<tr>
<td>28/02/2004</td>
<td>BOW MARINER</td>
<td>USA</td>
<td>Methyl tertiary butyl ether Crete industrial ethanol Methanol</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator / Dissolver Floater / Evaporator / Dissolver</td>
</tr>
<tr>
<td>15/11/2004</td>
<td>VICUNA</td>
<td>Brazil</td>
<td>Methanol</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator / Dissolver</td>
</tr>
<tr>
<td>11/01/2005</td>
<td>KASCO</td>
<td>Vietnam</td>
<td>Gas oil</td>
<td>Oil tanker</td>
<td>Floater / Evaporator</td>
</tr>
<tr>
<td>08/04/2005</td>
<td>GG CHEMIST</td>
<td>China</td>
<td>Toluene</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator</td>
</tr>
<tr>
<td>10/10/2005</td>
<td>SAMHO BROTHER</td>
<td>Taiwan</td>
<td>Benzene</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator</td>
</tr>
<tr>
<td>31/01/2006</td>
<td>BCC</td>
<td>France</td>
<td>Phosphoric acid</td>
<td>Chemical tanker</td>
<td>Sinker / Dissolver</td>
</tr>
<tr>
<td>14/09/2006</td>
<td>KREW BRIDGE</td>
<td>India</td>
<td>LPG (Butane)</td>
<td>LPG carrier</td>
<td>Gas</td>
</tr>
<tr>
<td>15/01/2007</td>
<td>GOLDEN SKY</td>
<td>Latvia</td>
<td>Potash (KCl)</td>
<td>Bulk carrier</td>
<td>Sinker / Dissolver</td>
</tr>
<tr>
<td>17/03/2007</td>
<td>HUI RONG</td>
<td>China</td>
<td>Urea / Sodium metabisulfite</td>
<td>General Cargo</td>
<td>Sinker / Dissolver</td>
</tr>
<tr>
<td>25/12/2007</td>
<td>EASTERN BRIGHT</td>
<td>S. Korea</td>
<td>Nitric Acid</td>
<td>Chemical tanker</td>
<td>Sinker / Dissolver</td>
</tr>
<tr>
<td>11/03/2009</td>
<td>PACIFIC ADVENTURER</td>
<td>Australia</td>
<td>Ammonium Nitrate</td>
<td>Containership</td>
<td>Sinker / Dissolver</td>
</tr>
<tr>
<td>07/08/2010</td>
<td>MISC CHITRA</td>
<td>India</td>
<td>Aluminium phosphate &amp; organo-Pesticides</td>
<td>Containership</td>
<td>React with water (toxic gas)</td>
</tr>
<tr>
<td>08/10/2010</td>
<td>YM URANUS</td>
<td>France</td>
<td>Pyrolysis Gasoline (Pygas)</td>
<td>Chemical tanker</td>
<td>Floater / Evaporator</td>
</tr>
</tbody>
</table>

**HNS Incidents attended and notified: 2000-2010**

18 attended and 24 incidents notified
INCIDENT

- Collision between the MSC CHITRA and the bulk carrier KHALIJIA III on approach to Mumbai and JNPT container ports on 7th August during monsoon

Collision resulted in CHITRA grounding at entrance to channel in 10m of water with a list of between 40-30°

- MSC CHITRA contained 2,500 t of IFO 380 & ~2, 300 containers (31 classed as Dangerous goods)

Resources affected

- Economic
  - Port disruption, Ferrys affected by containers, Oil terminal.

- Cultural
  - World Heritage site – important Hindu carvings
  - Also several (23) Hindu God immersion sites around area

- Environmental
  - extensive mangroves; important fish nursery
  - large mudflats

- Tourism
  - tourist ferry to Islands
  - Sandy beaches

MSC CHITRA Incident
Oiling

- Oiled Mangroves
- Oiled shoreline with JNPT container port in background
- Oiled tourist jetty at Elephanta Island
- The Green shoots of recovery!

Lost Containers

- Container losing its contents onto the shore
- 2 ISO H2O2, ISO tanks and a container
India’s Largest Spill

- Significant Media Interest; can work for and against ITOPF objectives

MSC CHITRA Incident

Significant Media Interest; can work for and against ITOPF objectives

Survey of shorelines

- Joint Surveys undertaken as much as possible
- Priority areas identified with suggested clean up methods; priority site was Elephanta Island to clean before 11th September (Ganesh Festival)
- Mangrove and mudflats recommended to leave alone

MSC CHITRA Incident
Dangerous Goods

- 31 Containers classed as DG – 13 lost
- One of these contained 2800kgs of Aluminium Phosphide (used as fumigant) in 1.5kg canisters

During salvage ops, the container with AIP collapsed and the AIP canisters lost into sea
- AIP + 3 H₂O → Al(OH)₃ + PH₃ (phosphine gas; v toxic)
**Dangerous Goods**

- Reports started to be received of oiled metal canisters being found on shores; potential public health risk if phosphine gas is found to be leaking.

**MSC CHITRA Incident**

<table>
<thead>
<tr>
<th>Health (Blue)</th>
<th>Flammability (Red)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very short exposure could cause death or major residual injury</td>
<td>Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instability/Reactivity (Yellow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water</td>
</tr>
</tbody>
</table>

**Phased approach to shoreline clean up**

- 1st phase – ensure shorelines safe for workers; write Risk Assessment and undertake modelling in different scenarios. Refine these as more data becomes available.

- Undertake regular air monitoring on beaches where canisters have been found.

- Information note produced in 3 languages for use/distribution by local authority.

**MSC CHITRA Incident**
Phased approach to shoreline clean up

• 2nd phase – Regular (initially daily) sweeps of the shore by a joint team of shipowner and manufacturer; correct PPE and safety measures to hand (positive pressure suits, O2 cylinder available, Decon shower)

• Collection, removal and disposal of all suspect canisters jointly by this team into airtight, non-reactive lockable boxes

• Keep local Authorities informed of progress

<table>
<thead>
<tr>
<th>Substance</th>
<th>Total Collected - 28th Aug</th>
<th>Collected from Elephanta Island</th>
<th>Collected from Alibag /Kihim Beach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canisters of Aluminium Phosphide</td>
<td>73</td>
<td>14</td>
<td>59</td>
</tr>
<tr>
<td>Bottles thought to contain pesticides</td>
<td>581</td>
<td>272</td>
<td>309</td>
</tr>
</tbody>
</table>

MSC CHITRA Incident

Phased approach to shoreline clean up

• 3rd phase – Once risk is lowered to acceptable level, oil clean up can begin; initially removal of oily debris, and then low pressure & high pressure washing of rocky jetties, walls, boulders

MSC CHITRA Incident
Results – Elephanta Island

MSC CHITRA Incident

14th August  28th August  24th September

Continuing debris removal operations...

MSC CHITRA Incident
“Alternative” treatments...

MSC CHITRA Incident

TERI, MPCB survey three sites to clean oil spill using bacteria

Continued Salvage ops...

MSC CHITRA Incident
LIQUID IN BULK

- SAHMO BROTHER (3,900 GT), Taiwan, 2005
- Cargo of benzene (3,136 m³)
- Explosiveness / Toxicity / Health & Safety

SAMHO BROTHER Incident

Modelling / Monitoring

AIR
- Provided NCEC modelling to the Authorities
- Recommendations on monitoring strategy
- Implementation of safety zone for shipping

WATER
- Assessment of risk for fisheries (Benzene is a partial dissolver)
- [benzene] in water column quickly reduced to background levels

SAMHO BROTHER Incident
Winds = from NE  
Currents = to N

Oil + liquid benzene

Benzene vapours

**Controlled sinking of ship – HNS issue?**

- On 27-10-05, Taiwanese Air Force attacked the vessel
  - 2 F16 using four missiles
    - Small damage to bow
    - Unable to sink ship
  - 2 Attack helicopters using 12 “Hell Fire” missiles
    - Non exploded
    - Limited damage
- Vessel sank by itself 5 days later
SOLID BULK

- FU SHAN HAI (38,603 GT), Denmark, 2003
- GOLDEN SKY (15,786 GT), Latvia, 2007
- Cargoes of Potash (Potassium Chloride) (66,000 MT and 24,000 MT respectively)
- Concerns amongst the Authorities (nutrient enrichment – Baltic Sea)
- Risk assessment

GOLDEN SKY Incident

The latest…October

- YM URANUS (4,829 GT), France, 2010
- Cargo Pyrolysis Gasoline (6,500 MT)
- Safely towed to Port

YM URARUS Incident
In brief…

- Ship source incidents involving HNS not as frequent as oil spills
- Volumes of HNS spilt may be smaller than in an oil spill as HNS carried in smaller quantities
- HNS Fate & Effects are very diverse and often differ from oil (estimated that 6,000+ chemicals routinely transported by ships)
- More HNS being transported around world, usually results in more accidents
- Health effects are an aspect of HNS spills not usually encountered with oil spills

Thank you