LESSONS LEARNED FROM RECENT SPILLS:

ERIKA,
IEVOLI SUN,
PRESTIGE,
TRICOLOR ....

By
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Cedre
Erika spill

A Nakhodka-like offshore spill by rupture of a passing ship
## The Technical Aspects

- A particularly viscous fuel oil, spilled at the start of winter, in an exceptional storm
- Wrecks sunk on fishing grounds, within reach of the existing intervention technology

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volumic mass</td>
<td>1.0025 kg/l</td>
</tr>
<tr>
<td>Viscosity at spill time</td>
<td>554.6 cSt at 50°C</td>
</tr>
<tr>
<td></td>
<td>20 000 cSt at 10°C</td>
</tr>
<tr>
<td>Viscosity after 48 h</td>
<td>350 000 cSt at 10°C</td>
</tr>
<tr>
<td>Pour point</td>
<td>3°C</td>
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</tbody>
</table>
A unique offshore force

7 vessels reached the area in 2-4 days:
• 2 fully equipped supply vessels (French)
• 3 specialised ones (British, Dutch, German)
• 2 boom equipped supply vessels (Spanish)
Specialised vessels: 1100 t recovered
An unbalanced final score

• In the circumstances, offshore recovery did well (1200 tonnes) but it was unseen and evident room for improvement remained.

  The need: more vessels, faster on site, better equipped, better informed

• Recovery in front of the coastline failed (20 tonnes) and full revision was needed.

  The need: a pre-organised and trained second line of response
An impossible modelling challenge

When monitoring and communication fail, modelling becomes scapegoat
Monitoring wrecks 120 m deep and preparing their neutralisation
Pumping 11 000 t of heavy fuel, from wrecks 120 m deep, in 2 months
Dealing with unpleasant surprises

Fuel stuck on sunken rocks, to be detected and removed by hand
Never again like that!

Taking initiatives at:

- national level
- European Union level
- international level
- and possibly Industry level
The Ievoli Sun accident

30th - 31st October 2001: A near to Erika scenario, less than a year later
Quick Hazard Assessment

• 4000 T. STYRENE : little soluble, potential for toxic cloud, for explosion, for tainting
• 1030 T. MEK : moderately soluble, potential for explosion/fire
• 1000 T. IPA : highly soluble, danger limited to recovery operations
• 150 T. IFO + 60 T GASOIL : the Erika heavy fuel still a hot subject
Building on Erika lessons - at sea

• Calling for immediate partners support: British MCA, German chemical/oil response vessel Neuwerk

• Communicating fast: each in own competence, including on the Internet
Fully Investigating the Risks

And showing people are safe
Wreck investigation

upturned,
3 breaches,
1 imploded tank,
minor seeps,
strong currents
Negotiation

• Leave them where they are, release them or pump them?
• At owner expense or at taxpayer expense?

⇒ Agreed target: the scientifically justified, directly financed by shipowner and partners
Understanding Styrene in seawater

Low solubility, no polymerisation

Graph showing:
- cuve ouverte stabilisée
- cuve ouverte non stabilisée
- cuve partiellement ouverte stabilisée
- cuve fermée stabilisée

Graph axes:
- % en polymères
- jours de vieillissement

Graph axes:
- Concentration (mg/l)
- Temps (heures)
Understanding Styrene in seafood

- Fast contamination, fast decontamination
- Tainting perceptible before danger for health
Understanding MEK if released

Low and slow solubility,
Release carefully
March 01: the Agreement

Styrene and IFO will be pumped,
MEK, IPA and Diesel will be released in
controlled way
Shipowner and partners will do it,
French Navy and MCA(UK) will control,
Minister of Transport will approve process
and contractor
A successful challenge

- 3012 m$^3$ of styrene
- 88 m$^3$ of IFO recovered, other products released, from 2 May to 5 June, in spite of extreme currents
- for 10% (?) the cost of pumping the Erika
Moving Further

French Adhesion to HNS Convention underway

European Chemical Industry ready to encourage R&D on Marine Spill Hazards
Ievoli Sun conclusion

Response performed well

But luck and goodwill of all parties helped a lot.

Next Time may be far more difficult
PRESTIGE

November 13, 2002
Cape Finisterre, Galicia
PRESTIGE

• Length :  243,5 m
• width :   43,4 m
• draft :  14,0 m
• Cargo :  77 000 t HFO
• Bunker :  742 t IFO 380
• Marine Diesel:  41 t

Source : The American Bureau of Shipping
TAKING A DECISION

THE DATA

- structure heavily damaged,
- engine and equipments stopped,
- ship drifting near the coasts,
- oil leak at sea,
- South-West wind force 9 & heavy seas.

13/11/02 ship drifting

TOWING to LA CORUÑA PORT

- draught 14.3m, 25 to 30° list
  -> draught too high,
- heavy sea and wind
  -> critical manœuvre
- risk of ship rupture

SHIP TOWED OFF THE COAST
Rupture of the hull around 8h00. The stern sinks around 11h45, the bow at 16H15, at 133 Nm West-South West of the cape Finisterre at a depth of 3500 m.

The Rijn Delta, the Ailette, 5 tugs and a Spanish frigate, a Chinese tug are on site. 5 helicopters and 3 planes are proceeding to aerial observation.

On the shore, the cleanup operations are going on. 5 sites have been opened.
THE OIL

- **Type**: Fuel N°2 (M 100)
- **Specific gravity**: 0.995 kg/l
- **Viscosity**:
  - 615 cSt at 50°C
  - 30 000 cSt at 10°C
  - 100 000 cSt at 10°C (6 days after)
- **Pour point**: 6°C
- **Water in Oil Emulsion**: 45%

Sources: mesures Cedre & certificat de qualité de Saybolt-Letonia
LAB & FLUME TEST / SAMPLING & ANALYSIS
Drifting and dispersion of the slicks monitored by

- *Planes*
- *Helicopters*
- *Drifting buoys*
- *Satellite imagery*
Position du Prestige le 17/11

zone de récupération de l’Ailette le 18/11

dérive calculée entre le 17 et le 18 novembre
Recovery at sea

Assessment:

- Oil spilled: **64 000 tons** (14 000 t in the wreck)

- **At sea recovery** (w/o emulsion 50-60%):
  - specialized vessels: **16 000 tons**
  - fishing boats: **36 000 tons**
OSRVs:

- 15 ships involved (B, Dk, F, G, I, NL, N, Uk)
- 16 000 t recovered (HFO#6000 t)
Operations in the coastal waters

- Fishermen of coastal waters with improvised means
- Others with specialized means

February: 300 fishing boats
N & NW of Spain
Operations inshore
A self-mobilisation never seen in Europe
Under water operations

• Oil in the water column
• Oil on the bottom

• how to detect & recover?
OPERATIONS ON THE WRECKS

- 20 leaks observed
- 17 plugged,
  - 3 stopped naturally
- residual leaks: 1 to 2 t/day

Source: O. Dugernay / Ifremer

Source: Comité scientifique ASASOR / Ifremer
EMPTYING THE WRECKS

More than 13 000 t recovered
And still tar balls were coming.

When would it stop?
HOW MUCH OIL STILL AT SEA?

Bilan des quantités de déchets liés au Prestige
Estimation commune de la réunion Espagne-France-Portugal
du 1er septembre

<table>
<thead>
<tr>
<th>Source</th>
<th>Total (tonnes)</th>
<th>Total (metric tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>1050</td>
<td>105</td>
</tr>
<tr>
<td>Portugal</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>1195</td>
<td>119</td>
</tr>
</tbody>
</table>

Total recovered on land: 1064.4 tonne
Total recovered on land in Spain: 605.3 tonne
Total recovered on land in Portugal: 11.8 tonne
Total recovered on land in France: 447.3 tonne
Total recovered at sea in Spain: 39.9 tonne
Total recovered at sea in Portugal: 2.8 tonne
Total recovered at sea in France: 14.6 tonne

Total recovered: 1064.4 tonne

Representation graphique en valeur arrondie
UP TO WHERE: PRESTIGE OR TRICOLOR SPILL??

Analyses et prévisions MOTHY à partir des observations du 08/09/2003

- Analyse MOTHY du 06 au 11/09/03
- Prédiction MOTHY le 12/09/03
- Prédiction MOTHY le 13/09/03
- Prédiction MOTHY le 14/12/02

Observations du 06/09/03 19 ng/l 1,5 ng/l
TRICOLOR: ONE MORE REGIONAL SPILL CALLING FOR REGIONAL COOPERATION

Position initiale :
le 02/01/2003 à 01h00 utc
Latitude : 51° 25,00'
Longitude : 2° 35,00'
Polluant : Fuel lourd
Masse volumique : 990 kg/m³
AND ALSO, LEAKING WRECKS,

CONTAINERS LOST AT SEA,...

AND WHAT NEXT ??
ROOM & NEED FOR FURTHER IMPROVEMENT IN PREVENTION AND PREPAREDNESS THROUGH INVESTMENT, R&D and COOPERATION