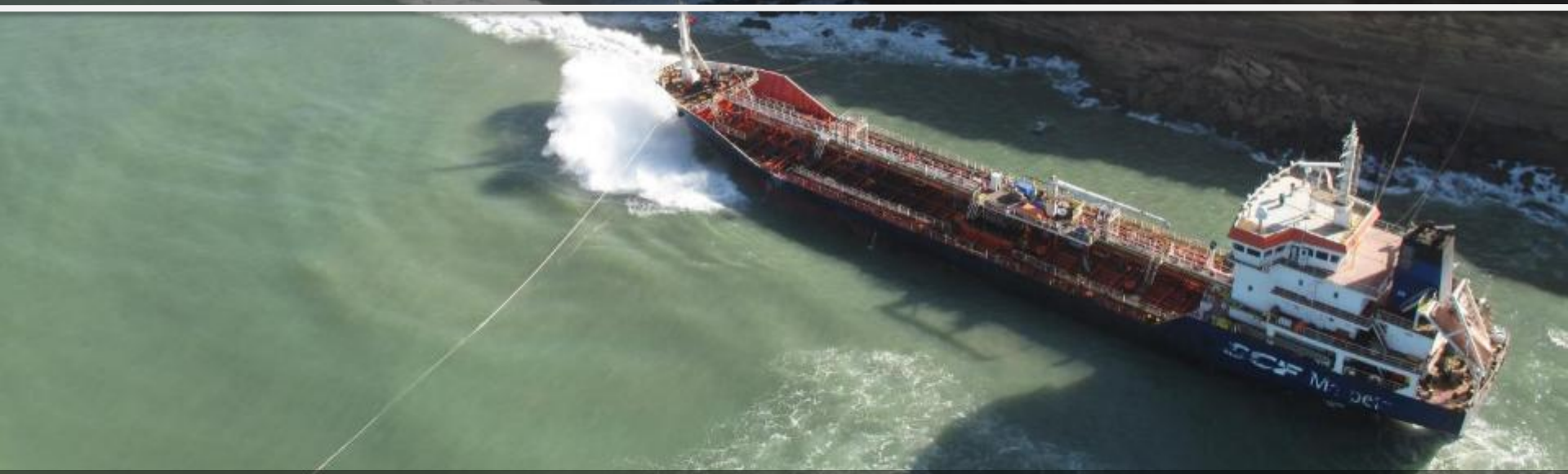
Alternative techniques used in spill response operations



Dr Annabelle NICOLAS-KOPEC, Technical Adviser, ITOPF Ltd.

20th Cedre Information Day - Paris, France, 10th March 2014

ABOUT ITOPF

- Not-for-profit organisation founded in 1968
- Funded by the shipping industry and P&I clubs
- Objective technical advice on marine spills (oil & HNS)
- Main source of technical advice for the shipping industry

ITOPF MEMBERS AND ASSOCIATES

Photo: Stena


Photo: Maersk

- ***MEMBERS***: 6,350 tanker owners & bareboat charterers
- 10,950 tankers, barges & OBOs - 340 million GT (>97% world fleet)

- ***ASSOCIATES***: Owners of other types of ship entitled to become associates since 1999
- 721 million GT of non-tanker shipping (>90% world fleet)

ITOPF

- A single office in London but a global service
- Staff of 33 including 16 technical advisers
- On site at over 700 spills in 99 countries
- International network of contacts
- Technical library and databases

SPILL RESPONSE

- 28 cases between January 2014 and January 2015
- 11 tanker incidents & 17 involving other vessel types
- Mainly small-scale bunker spills often involving complex issues

ROLE ON SITE

Technical advice to government, responders and victims

- Promote effective response, joint assessments & cooperation
- Extent and type of involvement varies depending on requirements
- Arrange for additional expertise & equipment to be brought on site & assist in response organisation
- Monitor spill response & investigate damage to sensitive resources
- Support in developing and implementing environmental monitoring programmes
- Assistance in preparing claims for compensation

Exclusively advisory role – decision-making the authorities' responsibility

IN-SITU BURNING

Advantages

- Eliminates large quantities of oil
- Reduces the quantity of waste to be handled

Limitations

- Window of opportunity: weathered oil is difficult to ignite
- Potential health risk (smoke)
- Heavy unburnt residues may sink
- Dependent on sea state (Gulf of Mexico, Caspian Sea, ice-covered waters)

Operational challenges

- Fire booms, herders and ignition systems
- Regulatory authorisation

IN-SITU BURNING

Use

- ISB is more likely to be acceptable offshore or in ice-covered waters (many field exercises) where there are fewer concerns relating to smoke plumes.

E.g. Deepwater Horizon, 2010: over 400 burns, eliminating between 30,000 and 50,000 tonnes of oil (5% of total quantity spilt).

- Technique used on land

E.g. Louisiana, following Hurricane Katrina in coastal marshes.


PHOTO: SINTEF

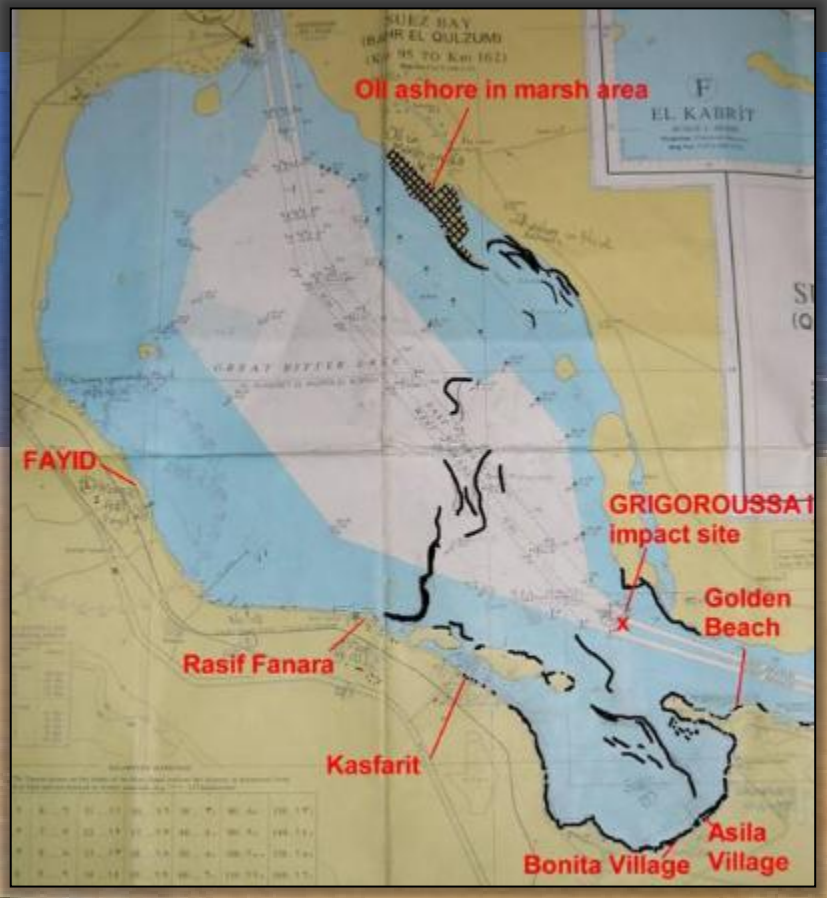

PHOTO: NOAA

ACCIDENTAL BURNING, AEGAN SEA, Spain, 1992

GRIGOROUSSA 1, Egypt, 2006

- 26th February 2006
- Great Bitter Lake, Suez Canal, Egypt
- Grounding
- Spill of over 1200 MT of IFO 360

EXTENT OF CONTAMINATION



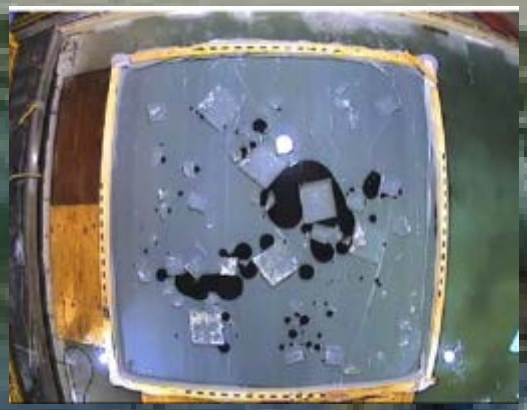
Southerly winds veering to northerly winds

- Main issue: potential slowing of traffic in the canal
- Military restrictions
- Lack of coordination between Suez Canal Authority and Egyptian Environmental Affairs Authority
- Late implementation of shoreline clean-up
- Initial response operations:
    - Dispersant?
    - In-situ burning
    - Burial of grounded oil

- In-situ burning technique used but not controlled
- Burning oil slick reached the shore, killing one person

HERDERS

- Support for recovery and burn operations by ensuring a constant slick thickness.
- Remove oil from inaccessible areas.
  Competing technique: use of hoses
- Arctic JIP: two products are authorised (EPA) in North American waters.
- Field studies and research in progress show that herding agents are efficient in very calm conditions.
- Rough weather disturbs the product and makes it inefficient.



SHORELINE CLEANING AGENTS

- Solvent alone (without emulsifying agents): facilitates desorption of oil from the substrate and forms a recoverable mixture.

- Solvents + emulsifying agents: facilitates desorption of oil from the substrate and promotes dispersion of the pollutant in the water column. Product not recommended for operations in shallow waters.

- Help to eliminate oil from man-made structures and vessel hulls
- Use prior to more traditional techniques such as flushing or pressure washing.
- Not recommended on the shore.

- Many countries have a list of pre-approved products.
- Limited knowledge of product ingredients: often closer to kerosene or dispersant. Often not to be recommended.

LORD STAR (2015) AND SAINT THOMAS D'AQUINAS (2013)

- Small-scale test always recommended.
- Balance between efficiency, time-saving and sensitivity.

- *LORD STAR, Brest, 2015*
- Test performed but impractical.
- Recovery impossible – pressure washing only option.

- *SAINT THOMAS D AQUINAS*, Philippines, 2013
- Appropriate agent: product without surfactants (such as vegetable oil).
- Product not on PCG list therefore use prohibited.
- Tests on a product containing surfactants but presence of mangroves, mud and benthic resources, where the oil could settle and contaminate the substrate and organisms present. Product not recommended.

BIOREMEDIATION

BIOSTIMULATION: addition of nutrients nitrogen and phosphorous.

- Can play a role in areas lacking nutrients.
- Natural biodegradation rates can be boosted 2-7 times (EXXON VALDEZ), but still very low in comparison to mechanical clean-up methods.

BIOAUGMENTATION (addition of microbes).

- In certain countries, the introduction of exotic species comes under strict regulations.
- Long term strategy (not to remove the bulk of the oil)
- Use as a finishing technique, in isolated regions or on sheltered coasts
- Conditions: dependent on environmental factors such as temperature, oxygen, exposure, presence of nutrients...
- Usually used on on-land pollution and for waste treatment with no/limited leaching.

BIOREMEDIATION- MSC CHITRA, INDIA, 2007

- Pressure from local authorities to use bioremediation to treat all waste.
- The partially government-funded Energy and Research Institute (TERI) set up two bioremediation sites.
- A test was approved by the authorities.
- Small-scale burying operation: contaminated sediment collected in a pit and microbes added.
- No control sites; limited or no monitoring plan
- Unconvincing results

OTHER TECHNIQUES

PRE-TREATMENT AGENTS

- ERIKA: alginates tested
- Where a building or heritage site needs protected

SOLIDIFYING/GELLING AGENTS

- Reacts with oil to form a rubbery substance.
- At sea, solidification should generally be avoided.
- Large quantity to be applied to slick (up to three times).
- If not completely recovered, degradation time is far longer.

OTHER CHEMICAL AGENTS

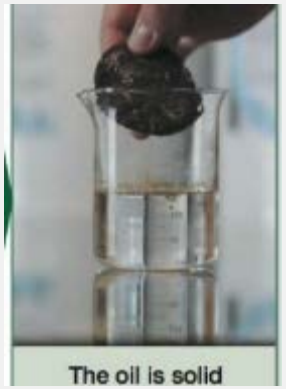
- Sinking agents

E.g. No recent examples although quite popular in the 1970s

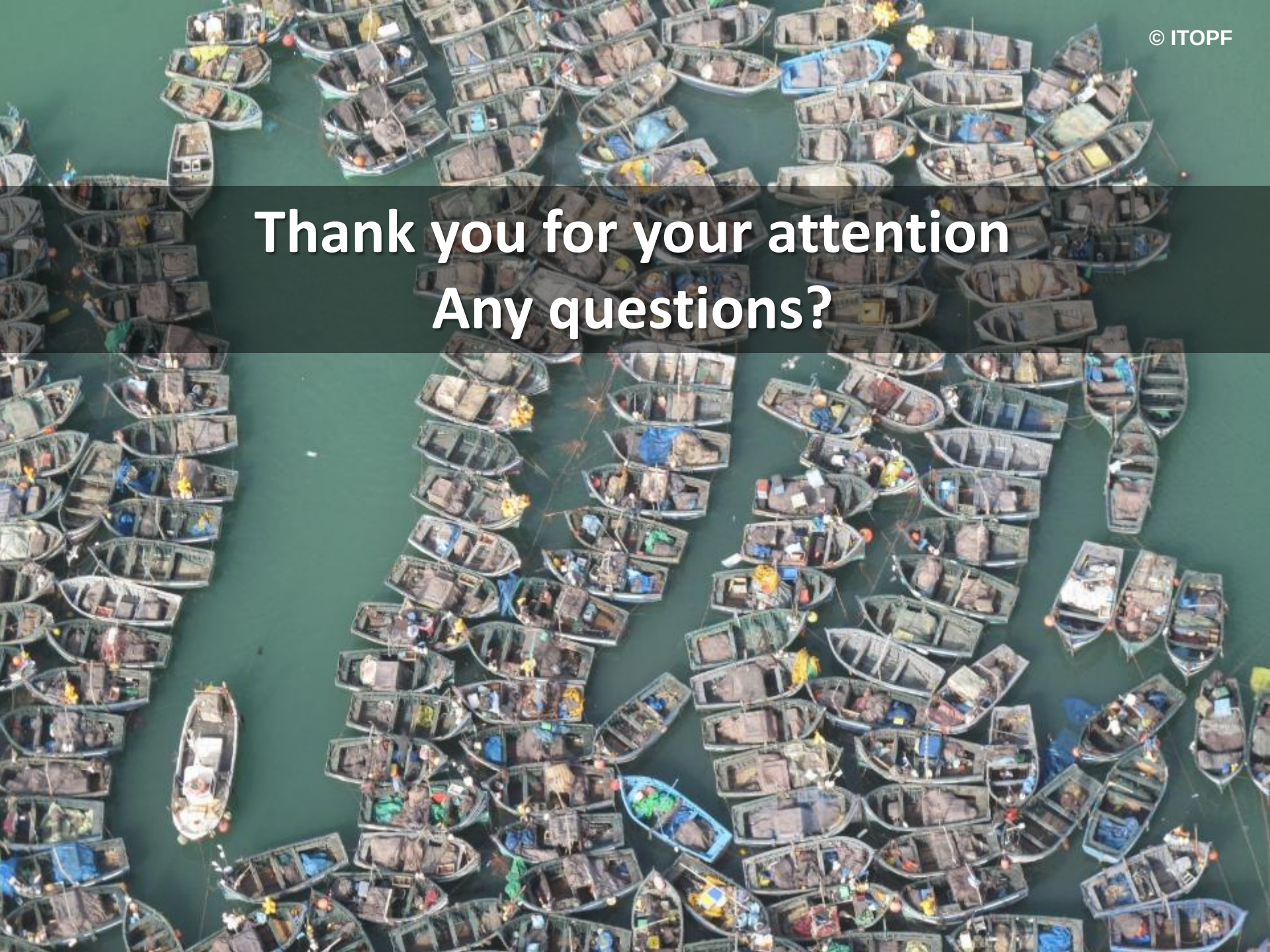
- Demulsifiers

E.g. For waste treatment rather than at sea

DIFFICULT TO IMPLEMENT DURING AN INCIDENT



ALTERNATIVE OR POORLY CONTROLLED TECHNIQUES?



Thank you for your attention
Any questions?