

HAZRUNOFF

PROJECT

Lessons learnt from accidents ECE incident

CEDRE

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The *ECE* incident (Channel 01-02-06)



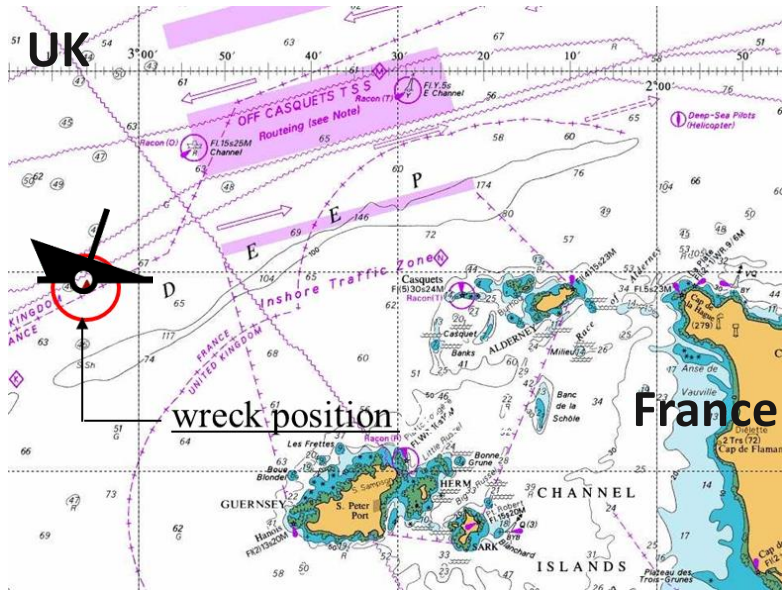
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Incident scenario

Collision



Source: French Navy

Collision with the General Grot Rowecki
Distress call sent to MRCC Jobourg
=> Leak and significant list

31st January :

5:00am: arrival of helicopters (British and French)

=> crew rescue operation

=> diving inspection

7:00am: arrival of a tug boat

3:30pm: beginning of towing

1st February :

3:37am: sinking

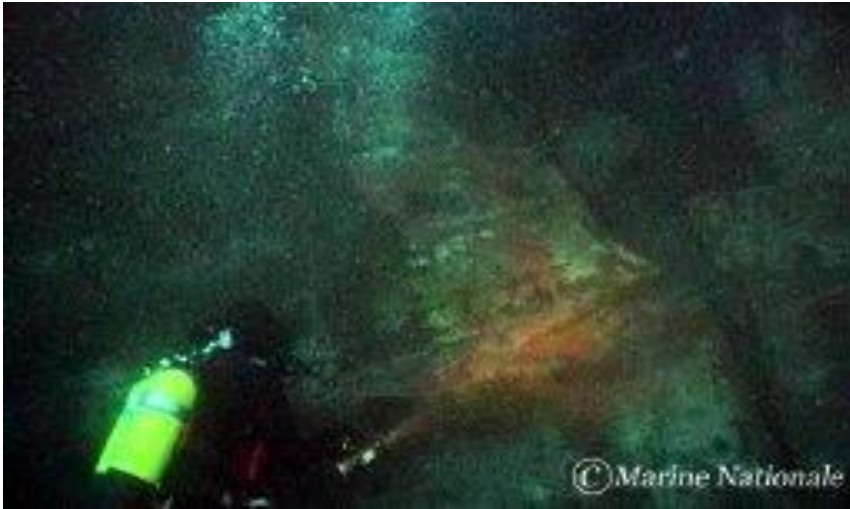


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Hole in the side of the vessel AND in the tank...



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Scene is Set

- ECE = Double hull (1988).
- Flag : Marshall Island
- 1 chemical (Phosphoric Acid) + Bunker
- Manche Plan activation (UK – France)
- Pollution looking like oilspill observed

For oil (**IFO 180** -70 tons, **Gasoil** -20 tons & **Lubricating oil** -40 tons)
Behaviour with ADIOS (Density < density of seawater, slightly soluble, potential for evaporation and emulsification processes...)

Slick forecast MOTHY



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First line of RESPONSE

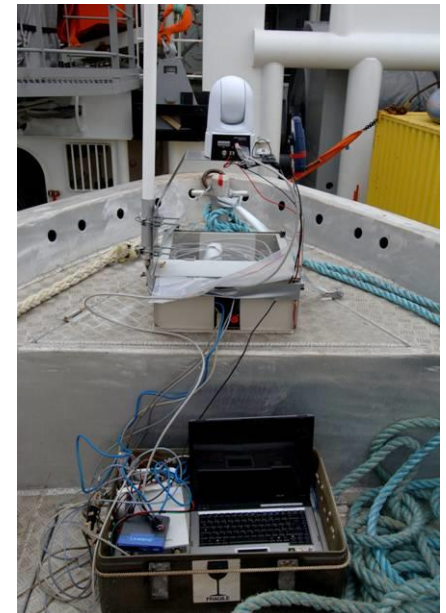
DETECTION / MONITORING OF CHEMICAL



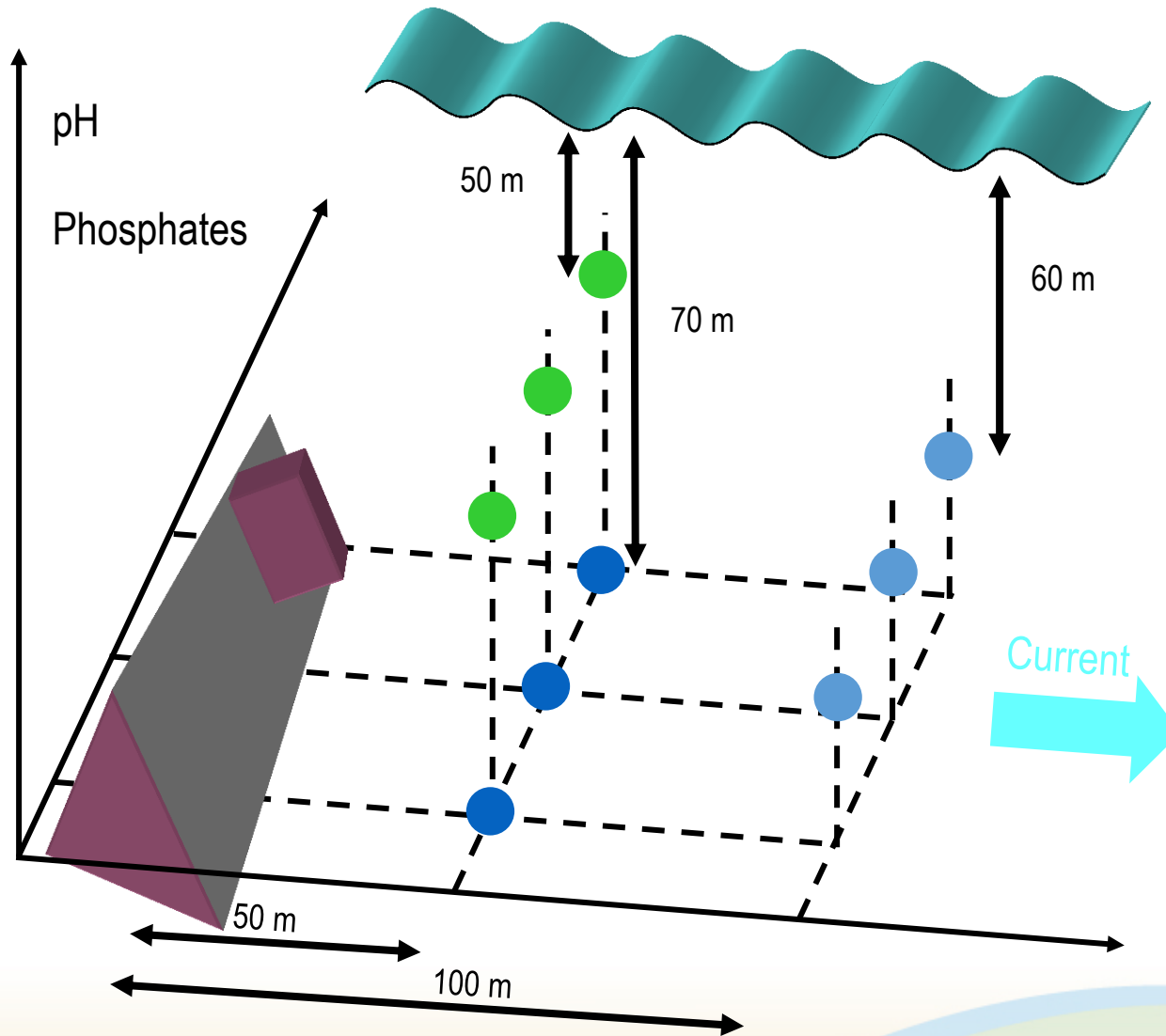
Remote controled
from *Argonaute*



DRONE with multisensor detection device



Monitoring close to the wreck



Several peaks of phosphate at J0 and J+10



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Response organisation

French Navy Headquarter in Cherbourg,
Manche Plan activated (UK and France),
Support by MCA (1 person at Cherbourg)

Meetings with the owner

Group of experts

To propose a response strategy
Water quality monitoring

Examine response options proposed by
the owner
(French Navy, Ceppol, Ifremer, MCA
and Cedre)



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Risk Associated to the CARGO

PHOSPHORIC ACID (10 000 tons)

What is it?

Behaviour in the marine environment ?

Toxicity (heavy metals)? Radioactivity?



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H₃PO₄: what is it ?

H₃PO₄ FDS

- Concentration : 72% H₃PO₄ = 52% P₂O₅
- Density 1.53
- Totally hydrosoluble
- Acid – corrosive
- Non volatil
- Non toxic, non bioaccumulable
- Heavy metals and impurities linked and radioactivity...

Soluble, Marpol Z



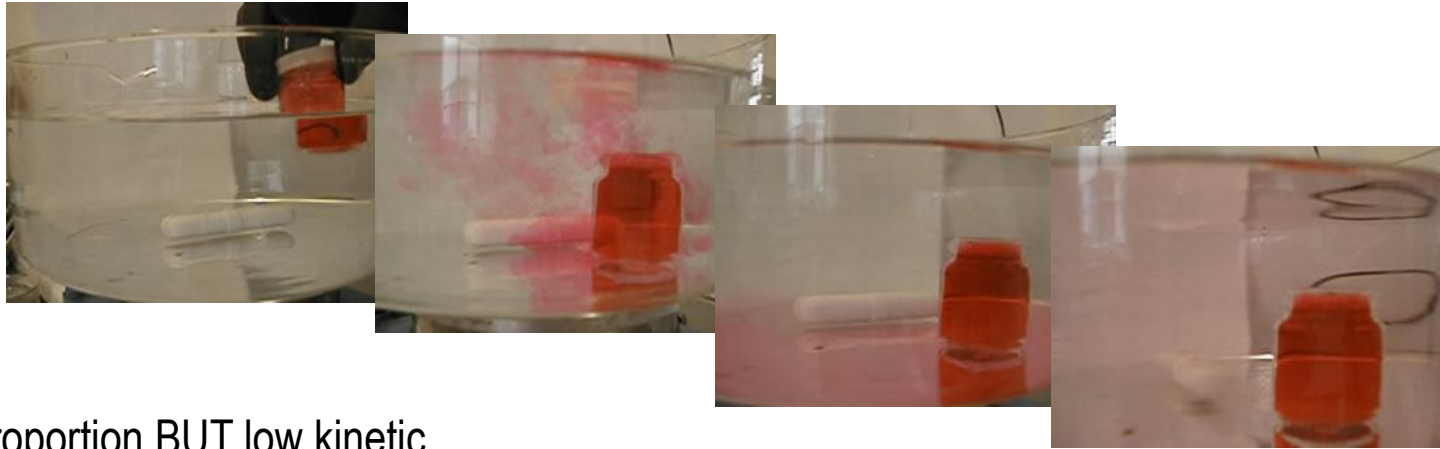
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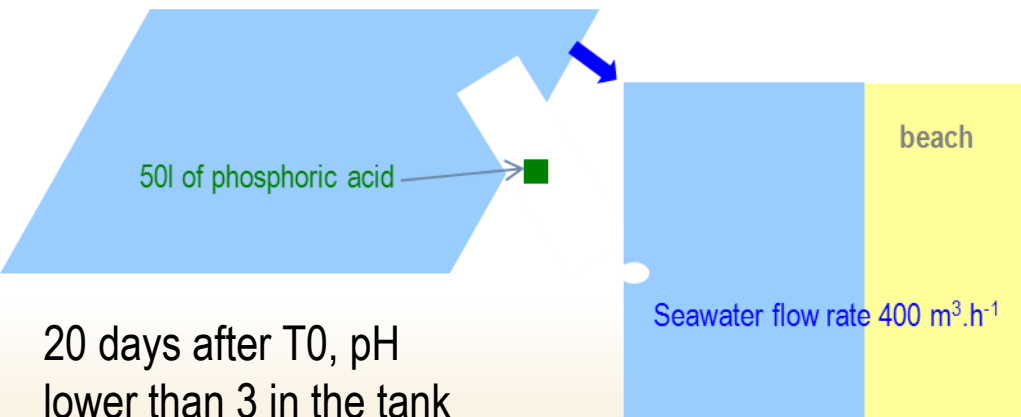
Experimental work

At lab



Density = 1,53

Soluble in all proportion BUT low kinetic

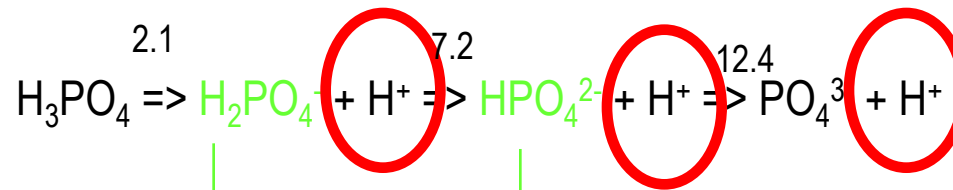


20 days after T0, pH
lower than 3 in the tank



Fate of the cargo

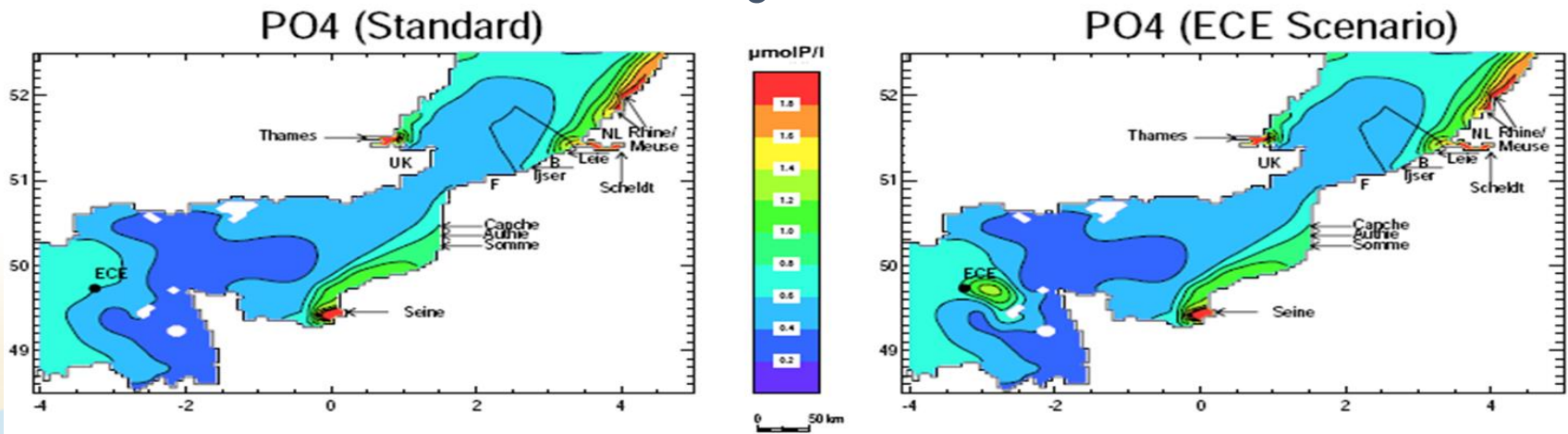
Area with strong currents, fast dilution of phosphoric acid



Can be used by algae

- 4-6 : 100% H_2PO_4^-
- 6-7 : 50% H_2PO_4^- et 50% HPO_4^{2-}
- 8 : 20% H_2PO_4^- et 80% HPO_4^{2-}

Modeling results



Fate of the cargo

- **Impurities** Hg (5kg), Pb (20kg), As (130kg), Cr (800kg), Cd (400kg), V (1000kg)
 - Heavy metals are a natural constituent of phosphate rock
 - These heavy metals would have been exposed to the environment in any case
- **Methodology applied**
 - following OSPAR, area = zone II = chronic heavy metals inputs
 - Cd, 6 ppm = 60 kg in 10 000 tones (cargo) and OSPAR estimations give 50 to 79 tones per year

↳ Less than 1%



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Fate of the cargo

- Bioavailability, bioaccumulation and biomagnification
 - In seawater, heavy metals will form complexes with organic and inorganic materials.
 - Biomagnification appears not to occur with inorganic metals.



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Fate of the wreck

- Minimum depth 44.5 m
- No appurtenances likely to be released
- TBT-free antifouling Jan 2005
- Small quantities of paints and cleaners
- Potential impairment of activities of trawlers and potters
- 57 wrecks in box 1 x 1/2° & 483 between 2° - 4°W
- Insignificant loss of fishing opportunity but longer term niche fishing
- Conclude wreck itself doesn't pose threat to environment or significant impairment to commercial fishing activities



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Conclusion

- Low release of the cargo
- IFO and lubricating oil recovered
- 21 days for the response on the wreck



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Take-home message

- All answers are **not in the literature...**
- Important to be able to conduct **experiments in emergency** conditions in order to provide authorities / responders with **right data**
- In some conditions, **slow release** of chemicals can be the best option
- Do not forget **“secondary” pollution**
- HNS incidents involve also **OIL**

No perfect solution, do not precipitate, calculate the risk and consider all options



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