Incident information sheet of ECE/ GENERAL GROT ROWECKI 2006

The incident

On the night of 30 to 31 January 2006, the Maltese bulk carrier the General Grot Rowecki, transporting 26,000 tonnes of phosphates from Safi in Morocco to Police in Poland, collided with the Marshall Islands chemical tanker the Ece en route from Casablanca in Morocco to Ghent in Belgium.

The incident occurred in an area located 50 nautical miles (90 km) west of Cherbourg, near the Casquet Traffic Separation Scheme in international waters. The Ece, transporting 10,000 tonnes of phosphoric acid, developed a leak and a significant list.

Breach in the Hull of the ECE ©FRENCH NAVY

Rescue operations

The CROSS (regional center for monitoring and rescue operations) in Jobourg supervised the rescue operations in cooperation with the Maritime and Coastguard Agency. The 22 crew members were safely transported to Guernsey island. The tug Abeille Liberté was sent to the collision site.

The Maritime Prefecture for the Channel and the North Sea (Premar-Manche) therefore launched an assessment of the pollution risk, with the support of the CEPPOL (88888888) and CEDRE, available as part of the Polmar-sea plan. Aside from the cargo, the chemical tanker contained, according to information from the charterer, 70 tonnes of propulsion fuel (IFO 180) and 20 tonnes of marine diesel oil. The striking vessel, which suffered damage to its bulbous bow, was able to start its journey again.

The tug Abeille Liberté arrived on site at 07h00. on 31 January. It did not note any pollution and assessment teams boarded both damaged vessels. The ECE suffered a stabilised 25° port side list and was not able to manoeuvre any more. Once the situation was assessed, the Abeille Liberté started towing the vessel toward the port of Le Havre at 15h30. During the tow, it sank 70 m deep 50 nautical miles west of la Hague, on 1 February at 03h37. The wreck remains in international waters, on the continental shelf claimed by the United-Kingdom, in an exclusive economic zone claimed by France and in the French pollution response coordination zone.
The Manche Plan, a bilateral agreement between France and the United Kingdom on rescue and pollution response, was triggered on 1 February.

Spill response

Negotiations started between the French and British authorities on one side, and the charterer and its insurers on the other side. They came to an agreement on 16 June to remove the remaining oil from the wreck (about forty tonnes) and the controlled and programmed release of the phosphoric acid by opening, with a remote operated robot, the access panels of each of the 6 tanks. The operation will be carried out by the charterer, in the summer, under the supervision of the authorities. Until it is over, the fishing ban around the wreck will be maintained. The Administration of the flag State was asked to communicate their position on the matter.

Lessons learned

- A global scientific and operational cooperation is necessary to respond to chemical pollution. (The Manche Plan between France and the United-Kingdom worked well).
- The pumping of fuel, lubricant, and noxious substances (which might create toxic gas clouds) is highly recommended.
- The controlled release of any soluble, non-toxic and non-bio accumulable cargo is permitted depending on the environment's sensitivity.
- It is necessary for the authorities to have precise knowledge on the physico-chemical properties of the products.

Complete information regarding the incident and the operations is available on the website of the maritime prefecture. This document will therefore be limited to the pollutant, the risks, and previous cases.

The pollutant and the risk for pollution

Phosphoric acid (H3P04) transported by the ECE came from the OCP group, one of the main global producers of crude phosphate, exporting it to about forty countries, along with phosphoric acid and solid fertiliser. In theory, the phosphoric acid contained aboard the ECE had a low heavy metal content.

Phosphoric acid is used in the production of fertilisers (super-phosphates), the protection of metals, the pharmaceutical industry, wastewater treatment, cleaning, refractory binders, paint, and part of the food industry.

Phosphoric acid one of the chemical products most transported in bulk. The US coast-guards listed phosphoric acid in 9th place on the list of chemical products most spilled.

CEDRE wrote a chemical response guide on phosphoric acid as part of its chemical response guides series published since 2004. This document provides information on the evolution of the product in the event of an incidental spill in water. It contains incident scenarios at sea, in rivers, and in inland waters, with advice on intervention (protection of operators) and pollution response.

No major spill of fuel or cargo was noted during this incident. But oil sheens were visible on the surface and, with confirmation during exploration of the wreck, phosphoric acid could leak from cracks in the hull, in pipes or tanks. The flow of these leaks could reach 25 m^3/hour. There is therefore no risk for major pollution but still a risk of a progressive spill. Since this product was, to our knowledge, colourless or

very lightly coloured and with a refraction index close to the one for water, leaks are hard to notice on video.

The phosphoric is, as all other acids, a corrosive liquid. It is not volatile and does not produce vapour. As it is denser than water (1.53 at 20°C for a ~50% solution of P205 or ~75% for H3P04), it sinks when spilled. It is also completely soluble in water and does not accumulate in the food chain.

The risk for man is mostly linked to possible contact with the skin or mucous membranes, which could lead to irritation or burns in case of prolonged contact with a concentrated solution. The same applies to marine animals: phosphoric acid leaking from the wreck could mix with water and make the surrounding environment more acidic. But it would quickly be diluted past this point in such a volume of water. Once the leak was over, the high neutralising power of sea water would quickly get the pH back to its original value (around 8) in the impacted area. The environmental impact would seemingly be too temporary and too localised to be noticeable.

The GESAMP, the group of experts commissioned by the International Maritime Organization (IMO) for the study of the various scientific aspects of pollution at sea, attributed a score of 0 for its persistence in the environment (on a scale of 0 to 5), a score of 1 (on a scale of 0 to 6) for acute aquatic toxicity, and a score of 3 (on a scale of 0 to 4) for toxicity by contact or consumption by marine mammals.

The MARPOL convention of 1973 organised the products transported into 4 categories (A,B,C,D) depending on the risks they pose for marine resources, human health and damage to amenities. Phosphoric acid is in category D which corresponds to the less dangerous products. This category includes "noxious liquid substances which if discharged into the sea from tank cleaning or deballasting operations would present a hazard to either marine resources or human health or cause harm to amenities or other legitimate uses of the sea and therefore justify the application of special anti-pollution measures".

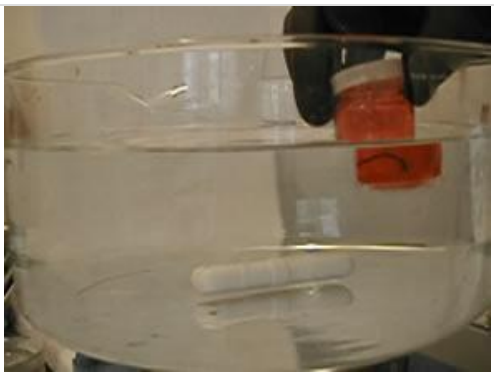
There is therefore no immediate risk for large scale pollution by phosphoric acid. But the question was, as for every other wreck, on the eventual recovery of potentially polluting products (acid and fuel) trapped in the vessel.
To assist decision-making, on the assessments to carry out and the actions to implement, CEDRE launched a series of dilution tests in laboratory with dyed phosphoric acid and water acidity measures. The first results showed that the acid spread on the sea floor before diluting in a couple of minutes when currents are absent or that it quickly diluted from the leaking point in presence of current (turbulent environment). It progressively decomposes in hydrogen ions (H+), responsible for the lower pH and in phosphate ions (P04--).

A question was raised regarding a possible fertilising effect of phosphate ions, capable of generating an uncontrolled development of green algae in the event of a large spill. This is the domain of expertise of IFREMER. But, in any case, a massif spill is not on the agenda and the presence of phosphate ions in February would not impact the development of green algae.

Main incidental spills of chemical products identified by the US Coast Guard (1992-1996)

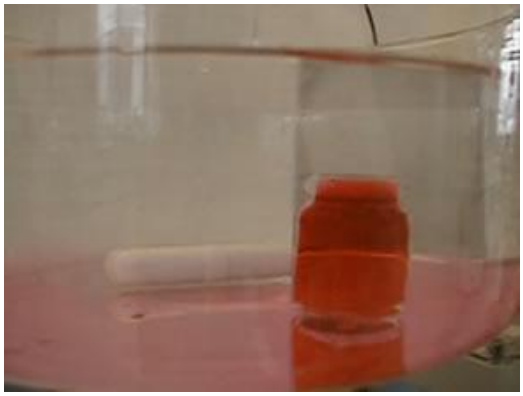
Main products spilled	Number of spills	Category
Sulphuric acid	86	D
Toluene	42	FE
Caustic soda	35	D
Benzene	23	E
Styrene	20	FE
Acrylonitrile	18	DE
Xylene	18	FE
Vinyl acetate	17	FD
Phosphoric acid	12	D

Standard European Behaviour Classification for the short-term behaviour of spilled products
D: Dissolvers
DE: Dissolvers and evaporators
E: Evaporators
FE: Floaters and evaporators
FD: Floaters and dissolvers

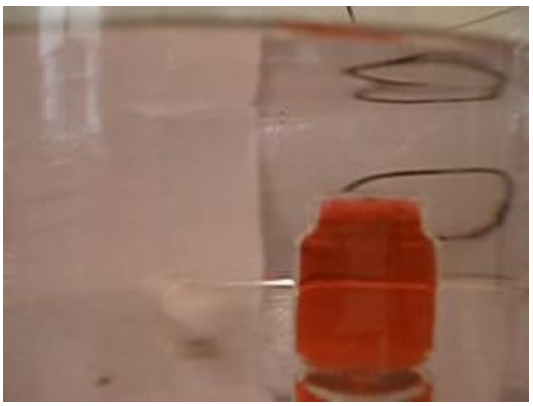


1. Introduction of a small closed jar of phosphoric acid dyed with rhodamine in a crystallizer filled with seawater ©CEDRE

2. Slow dissolution of the acid after opening the jar, without agitation ©CEDRE



3. The acid, denser than water, sinks and spreads at the bottom of the crystallizer ©CEDRE



4. Starting agitation, quick dissolution of the product ©CEDRE

Other examples of incident involving acid

Spills at sea or in port areas due to allisions, wrecks, or material damage are numerous. The consequences were sometimes drastic for the crews. They were always localised, very temporary and had a generally low impact on the environment.

Wreck of the Cason ©CEDRE

Phosphoric acid

- The presence of barrels of phosphoric acid in the multi-chemical cargo of the Cason, which ran aground and caught fire on 5 December 1987 in Cape Finisterre, Spain (See Cason incident sheet);
- a leak from a fertilizer producing plant in a river of 336 tonnes of fertilizer made of 75% of phosphoric acid, on 4 May 1988 in Gibson, Florida;
- the derailing near Bethel, North Carolina, of a train transporting chemicals including phosphoric acid, with a partial spill in an affluent of the Tar river, on 1 February 2000;
- the spill in a drainage system emptying in the Peace river of 15,000 m^3 of industrial water containing phosphoric acid, coming from a fertilizer producing plant in Lakeland, Florida, after a hurricane on 29 September 2004.

The impact studies which were carried out did not show significant environmental effects linked to the spill of phosphoric acid during these incidents far from the spill point itself.

Sulphuric acid

- A manipulation mistake led to acid being pumped over board for 11 days in the terminal of Trevo, Brazil in August 1998 (see the Bahamas incident sheet);
- on 10 November 1998, 100 tonnes of concentrated sulphuric acid were found in the chambers of the double hull of the Panam Perla (see the Panam Perla incident sheet);
- The quiet sinking of the chemical tanker Balu off the Bay of Biscay on 20 March 2001 with 8,000 tonnes of sulphuric acid in its cargo (see the incident sheet Balu);
- The sinking of the chemical tanker Ena 2 in the port of Hamburg on 28 June 2004, following a manoeuvring mistake, causing the spill of 6 tonnes of sulphuric acid in a harbour basin (see the ENA 2 incident sheet);
- A ruptured tank in the Kemira chemical plant in Sweden, on 4 February 2005, leaking 11,000 tonnes and causing a toxic gas cloud and an exothermal reaction with water. For 3 hours, 110,000 citizens remained inside, waiting for the toxic cloud to dissipate.

Hydrochloric acid

- In the Netherlands, in 1979, the Sindbad lost part of its cargo: 51 cylinders (1 tonne each) of chlorine, which create hydrochloric acid when in contact with water. Some cylinders were quickly found and recovered. Five years later, 27 cylinders were localised and destroyed on site due to the corrosion level. 13 cylinders are still missing;
- On 28 April 1998, the chemical tanker Martina, with a cargo of 600 tonnes of hydrochloric acid, collided with a container ship in Sweden. The vessel broke in two and sank, 5 crew members were lost. The cargo was uncontrollably released.

Nitric acid

- On 7 May 2000, off Alexandria, Egypt, the Dalhia-S sank with 165 tonnes of nitric acid on board. An intervention was considered on the wreck, but does not seem to have been carried out;
- The Stolt Rotterdam barge caught fire and sank in the Rhine, in Germany, on 15 November 2001 with 1,300 tonnes of nitric acid. It took a week to pump the product from the intact tanks.

The main issue regarding these types of incidents was the risk to crews and, in port areas, to citizens, particularly because of the production of gas clouds and exothermal reactions of the acid with metal. Lives were lost in the Cason and Martina incidents.
Data on the environmental impacts is scarce. There was either no impact study (e.g.: Balu), or they were more qualitative than quantitative (e.g.: fertilizer plant in Gibson).