# Incident information sheet of LYKES LIBERATOR 2002

## The incident

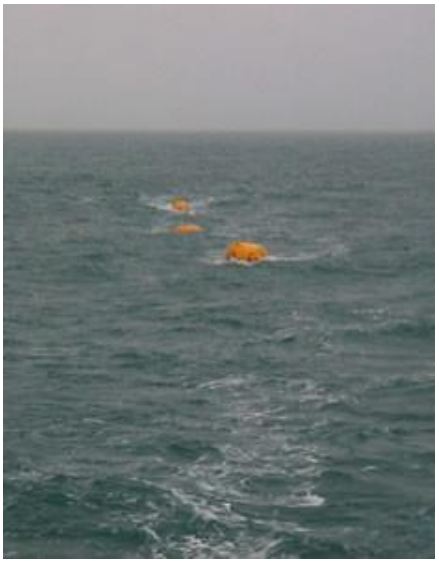
On Saturday 2 February 2002, the container ship Lykes Liberator, journeying from Bremerhaven (Germany) to Charleston (USA) with 3,000 containers on board, alerted to the loss of 60 containers due to the weather, 120 nautical miles West of Sein island. One of the lost containers transported hazardous products. It was a 40 feet long open container (meaning that it was a simple metal structure without walls or a roof) containing 3 tanks of chemical products.

The Maritime prefecture for the Atlantic immediately took note of the risks the containers could pose to navigation if they were floating as well as environmental and human risks. A surveillance aircraft from the French Navy located a yellow tank the same day in the area signalled by the Lykes Liberator. The observation was confirmed the following day. But the tanks could not be found again.

Drifting tank ©CEDRE

The French Navy asked CEDRE for a drifting model of the tanks using the available data, CEDRE in turn asked Météo France. The 5 day model showed a drift prevision in the Ushant rail around 5 February, then in the Channel around 6 – 7 February.

On 5 February, the Maritime prefecture asked for risk assessment regarding human health and the environment in the event of grounding of the tanks. The data sent by the vessel regarding the tanks was not precise: the reference was for a group of chemical catalysts, aluminium alkyds, but no product in particular. The risk for human health could be generally confirmed (risk of explosion), but not the environmental risk. It was necessary to obtain precise information on the product, through data in the vessel's manifesto (= bill of lading), particularly on the container carrying the three tanks. This paper was the only thing that could provide the necessary data and the supplier’s contact information.



Towing of the 3 tanks ©CEDRE

The required paper was obtained on 7 February. The supplier was contacted immediately. The good flotation of the tanks was easily explained: they were empty, but not inerted and closed, which was the usual practice for returns in this sector of activity. They could therefore still contain up to a dozen litres of product and vapour.

The products were indeed chemical catalysts, used mainly in the synthetic rubber, cosmetics, and pharmaceutical industries: diethyl aluminium iodide in two tanks and diethyl zinc toluene in the third. These are hydro-reactive products (high heat radiation in presence of water), which spontaneously combust in the air and can cause important burns. The supplier, the Albemarle Europe Sprl company (Louvain, Belgium) reacted in a quick and responsible manner, providing complete data on the tanks, the risks they posed, and precautions to take the same day. It also gave access to the French authorities to its emergency response unit.

On Friday 8 February, a tank was seen near the Ushant rail. The maritime prefecture made the decision of launching a recovery operation the following day.
On Saturday, 9 February, the 3 tanks of chemicals were located 15 nautical miles North-West of Ushant, 5 nautical miles from each other. The Abeille Flandre was sent on site to position the tanks. An intervention team was created and boarded the offshore support vessel Alcyon, with the goal of towing the tanks to the port of Brest. A technician from CEDRE was part of the team. The operation succeeded on Sunday 10 February. On the morning of Monday, 11 February, the tanks were lifted on the container quay in the port of Brest and transferred to the security manager of the Albemarle company.

Detection of a tank by the Alcyon ©CEDRE

The incident did not lead to injuries or pollution but still required a major emergency response, in harsh conditions, to ensure correct protection of men and the environment.

## Derivation model of the lost containers

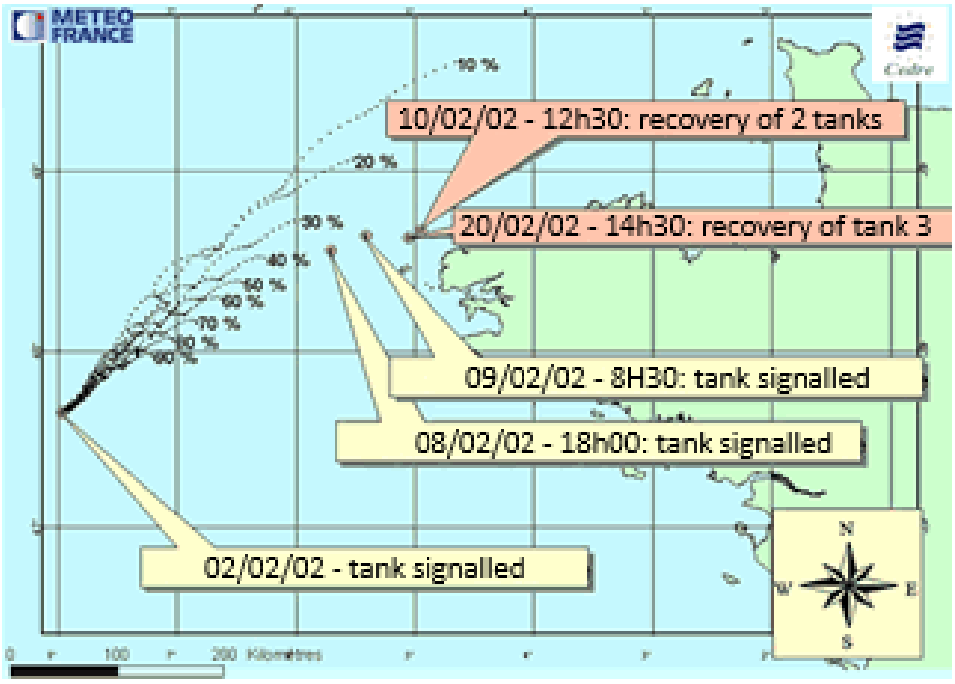
Most of the containers lost at sea sink immediately or in the first hours. The total mass of the "box" and its content is often higher than the mass of water displaced. When it is not the case, the empty spaces around the cargo progressively fill with water (the containers are not completely airtight) and the positive floatation of the start progressively becomes negative. But for containers with a cargo lighter than water, such as partly empty barrels or tanks that might be released from a broken container, can float for weeks or more. They can then become a hazard for navigation before they run aground on a relatively remote shoreline.

Therefore, the first two questions asked to CEDRE by maritime prefectures when a vessel loses containers near French waters are: "Will some of the containers float for a long period of time? " and "if they float, where will they go?" The answer to the first question goes back to the subject of "information research on risks" (see following section): any answer regarding floatability is but a bet until direct contact is established with the operators responsible for loading the container. Expanded polystyrene packaging, bubble wrap, or an empty space above the liquid in a tank can change everything. This does not prevent the creation of a derivation model, but it could only act as a hypothesis.

A close cooperation with Météo France helped develop a tool specifically designed for this type of modelling. It is a modified version of the MOTHY oil slick drift prevision model, adapted for container issues. On 2 February, as soon as the maritime prefecture for the Atlantic announced that the Lykes Liberator had lost 60 containers the previous day and that a flyover signalled a yellow tank in the water, the on-call manager at CEDRE asked Météo France for a derivation simulation. It took into consideration every floatation level for a container (from 10 to 90%). All results showed a derivation from the SW to the NE. Containers with a low immersion rate (10 to 30%) would enter the Channel starting 5 February, near the Ushant rail.

On the 6, the maritime prefecture received news that the lost tanks were empty. This was major information for aerial research, which did not find anything between 2 and 6 February due to the poor weather conditions. In the morning of 8 February, the maritime prefecture and CEDRE asked Météo France for an additional simulation on 3 days, from estimated positions on 5 February at 13h00, with immersion rates of 10, 20, and 30%. The results of this additional simulation showed a possible presence of the tanks between the north of Ushant and the Channel Islands.

On the same day, at 18h00, a yellow tank and a red container were signalled. A new simulation was immediately done. On 9 February at 8h30, the 3 tanks of chemicals were located 15 nautical miles North-West of Ushant, 5 nautical miles from each other. They were tagged by the Abeille Flandres and recovered the following day by the Alcyon.




MOTHY (Météo France) derivation prediction for 05/02/2002
from observations made on 02/02/2002 ©CEDRE

Upon arrival in Brest, in a sheltered area, the immersion rate of the tanks was estimated between 20 and 30%. The model seemed to have predicted a quicker drift than in reality. But the bases of the tanks, which were submerged, added considerable drag, estimated to equal a dozen of additional immersion points. Yet, the model with a 40% immersion rate was close to reality.

This example showed the general problem of drift simulation for a container. The model used must be precise and reliable, which is hard to do near the coastline, where interferences are numerous. But the operators must also know every floatability and exterior shape characteristics of the object they are trying to follow, so they can choose the most appropriate “immersion equivalent” in the results. Any approximation, even minimal, could result in considerable differences between the prevision and reality, even more in a case such as this one, where the volumes followed drifted almost parallel to the coast.

## Information research on risks

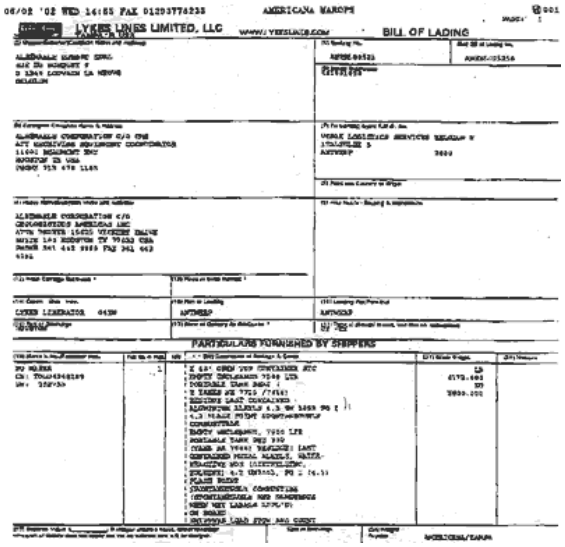
Easy access to information on the physico-chemical properties of a product and the risks it poses for human health and the environment when spilled is essential in a situation such as this one. The main priority for a captain losing containers is to make a quick inventory of their numbers, to alert the outfitter, which will contact the insurance. 60 containers lost in a cargo of 3,000 is a less important incident than a mechanical failure which would lead to a late arrival. The containers lost at sea are considered as "complete loss", a line on a form, which the insurers will handle.

Continuing its journey and knowing that the nearest maritime traffic control centre will be asking the question, the captain asked the charterer for the classification of each product transported in these containers. The information is available on board as a copy of the cargo's manifesto (bill of lading), within which each page contains information on one container, names and addresses of the sender and recipient, as well as essential characteristics of the product(s) inside. Another copy is available to the charterer's representative in the port of shipment.

This page is precious for CEDRE and its counterparts in other countries. The UN classification, or IMDG code (International Maritime Dangerous Goods code) alone cannot identify a product, only a group of products in one type of packaging. It is wholly insufficient to determine whether the container will float or not, for how long, if it is dangerous to the responders, or if it poses significant risk for the environment. This is where the declaration of hazardous cargo is essential to the responders. Therefore, 4 days after the loss of the containers at sea, on 5 February, the maritime prefecture was able to inform CEDRE that one of them transported hazardous chemicals, IMDG class 4.2 (Substances liable to spontaneous combustion) under the reference numbers UN 2003 (metal alkyls, metal aryls) and UN 3052 (Aluminium alkyl halides). These groups of products are transported in P400 type packaging (steel, aluminium or metal drums, jerricans or boxes) or P404 type packaging (combination, metal or composite packaging). What amount? In what packaging? Which products exactly? It's a mystery. At best, it was possible to say that there was a risk for explosion, that the containers might have floated, and to get a drift model with different immersion rates.

A new message gave additional information on these characteristics at the end of the day. The 40 foot-long container of class 4.2 hazardous products contained 2.8 tonnes of metal alkyls (UN 2003) and 5.6 tonnes of liquid residue of Alkylaluminium halides (UN 3052) in type I packaging.

On 6 February, the "Lykes Lines Ltd" outfitter finally provided the maritime prefecture with a copy of the manifesto page on the container. It was made available to CEDRE on the morning of 7 February. Although it was difficult to decipher, the document indicated that three 7,500 L tanks were placed in an open top container. These tanks were empty but had not been cleaned. Two had contained class UN 3052 products (aluminium alkyl) and the third class UN 2003 products (metal alkyls).

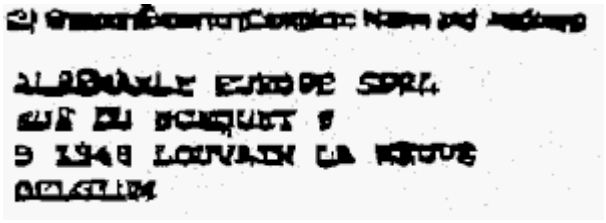


LYKES LINES LIMITED, LLC

BILL OF LADING

PARTICULARS FURNISHED BY SHIPPER

Extract from the manifesto on the container of hazardous products, as given to CEDRE



Zoom on the supplier's name and address extracted from the manifesto above

This gave the idea that the yellow tank photographed by an airplane of the French Navy on 2 February was one of them, escaped from the container. Drift previsions showed that it was heading to the Channel. It was necessary to know more. The supplier was located in Belgium, the receiver in the USA, the addresses were hard to read and the phone numbers unreadable. A search in global directories helped contact the security manager of the supplier around midday.

He instantly gave CEDRE the exact names of the products, informed the teams that the tanks were empty but not inerted, airtight but not sealed, and equipped with safety valves. They could float for months. The safety sheets of the products were later sent via fax. It was finally possible to give precise safety advice, announce that there was no risk for the environment, add that the company's safety manager was ready to provide on-site support and manage the tanks once they were recovered.

### Information research on risks

Following the incidents of the Sherbro (1993), which lost 88 containers in the Channel, the MSC Carla (1997), which lost a container of radioactive cells off the Azores, the MSC Rosa M (1997), in a difficult situation in the Channel with its cargo turned upside down, the Melbridge Bilbao (2001), holding in cargo a potentially dangerous catalytic mixture which needed to be assessed before towing the vessel towards Brest, the loss of 60 containers by the Lykes Liberator was another example of the issue with risk evaluation during an incident involving a container ship.