Chemical Spill in Latin American Port Areas: Lessons learned in Panama with the Spill of the Chloropivaloyl Chloride

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In our Latin American Ports it is a common factor the lack of response on spills. Nevertheless Panama is one of the best prepared. We started with the oil spill response capability via a contract between the Panama Port Authority and a private company who replaces the former response unit from a department in the Port Authority. The actual responsibility of the Authority is to assure that the company does their work efficiently and to supervise and regulate the aspects related to any kind of pollution that can be produced due to accidents in the port area.

In the Panamanian case the company which has the response responsibility, was required to invest in the necessary equipment in a time span of two years, that was 11 years ago, and to increase the capabilities to react in case of spills different than hydrocarbons. Actually the oleaginous oils are considered toxic spills as well.

These capabilities are also in different kinds of chemicals and within the MARPOL convention, in the reception facilities for all the annexes.

Differently from the oils, chemicals do not have a routine of actions. There are many ways to proceed in accordance with the chemical that has being spilt and some times, in accordance with the matrix or material where the chemical spilt.

There are some recent cases that deserve to be mentioned:

On July 8, at 2:00 am in the port city of Puerto Cortés, an irritating cloud emerges from the port area in a dedicated area for hazmats at the container yard. Sometime after the clouds dispersed over the vicinity residential areas, thousands of neighbors residents awoke with breathing problems, a pungent sulfurous smell were perceived. Some people realized that was a toxic gas and protected themselves with moist clothes in an attempt to filter the air. Some pass out because of the gases or because they hysteria created. Thousands must be evacuated and the streets suddenly jammed with persons and cars running away, the hospitals became flooded with instant patients. Five neighborhoods were affected with the toxic clouds. Fortunately there were no fatal victims.

Figure 1

Toxic Cloud from self ignited Sodium Hydrosulfite

Figure 2

The Firemen finally opened the container

The cause of the cloud was a container stuffed with Sodium Hydrosulfite, used as textiles bleach and is commonly used in several assembly plants industries inside Special Processing Zones of these Central American countries. Even that the Port Authority stored the container in a segregated area, the fact that the product is normally transported and kept in the port, caused that the personnel lost the alertness. The product is also classified as flammable and combustible material in certain circumstances (IMDG). The container with the chemical was not properly stored. The product was kept on the container yard, which allows moisture to penetrate the container during the heavy rain season. This chemical needs only moisture to ignite so the air humidity could be enough if a seal is not working properly. Such situations are not new in Latin America and periodically reoccur in any of its ports. Bureaucratic procedures not properly made ignorance, inadequate budgets, and misguided priorities by the authorities. There are many things working together contributing to the occurrence of these accidents. Effective prevention and responses and are still slow in many public ports, and even in Latin America private ports.

Just a week before this incident, there was another chemical alarm at the port. This time was on board a vessel. A container stuffed with Acetic Acid leaked, producing also toxic vapors. This product requires full protection and positive pressure protective devices.

Is very reactive and there was not equipments at the port or at the fire department capable to handle this kind of spills

Figure 3

Persons affected receiving first aid at hospitals

Figure 4

After daybreak; the people still jammed the streets

I was present at Puerto Cortés when this spills occurred so I could gather firsthand information of what happened and how the events where handled by the authorities.

Spills like this will always occur. The main issue is that the lessons are not learned everywhere; they probably believed their response was satisfactory. After all there were no fatal victims. The firefighters were happy. They pour water and the fire was extinguished. They did not realize that they were contributing to create more toxic vapors. The correct procedure is to form a mist to cool down the container, not a gush of water.

It is not the intention of this paper to compare Honduras with Panama. We have some similar situations but maybe the best thing that we have is the relations with the private sector. The Panamanian ports are managed today by international operators among them Stevedoring Services of America and Hutchison Ports. Several companies in the system that are receiving products with the reception facilities in accordance with the annexes of MARPOL 73/78

There are other companies developing the expertise in the handling of Hazmats to serve the industries and not only the ports.

I will present a case that occurred at the Port of Balboa and was attended by two companies related to pollution control.

A vessel working at the port was transporting a potent chemical. The product was CHLOROPIVALOYL CHLORIDE this chemical is used in the pesticides industry and in the process to produce other chemicals. It was once tested as a precursor of chemical weapons.

One of the drums with the product was punctured by a fork lift and some of the

product spilt out. The reaction team at the port immediately tried to wash it away with water. No one had the initiative to consult the MSDS of the product.
The personnel at the site started to feel dizzy and sick so they left the incident site. The next procedure was to call OPC which is the contracted company by the Port Authority and today by the Maritime Authority. The company activates its contingency plan and with the proper equipment and full protected personnel, proceeds to recover the product and place them in chemical resistant drums. A total of 120 US gallons (454 litters) were recovered.

Figure 5

First response at the port. The personnel are wearing protective equipment and full face mask.

The protective equipment was not the best for the situation, we can say that some good level of protection was achieved, but the spill was controlled and the acid contained.
The product was sent to a protected, covered area and kept there for more than one month.

During that time the case was submitted to GPL Laboratories which is a

contractor for the DOD and DOE in the United States of America.
The idea was to prepare a protocol in order to neutralize and to destroy later the product. A chemist was contracted in Panama to help in the handling of the product. Some samples were taken and tested to verify the best way or the best product to neutralize the acidity. Fly ash was selected.

The procedures were presented to the Maritime Authority and to the ANAM or National Environmental Authority. When approved, the procedure started.

1. An isolated place was selected in order to avoid people in the vicinity. Heavy toxic fumes were known to be produced.
2. The product was mixed with a the soda ash and water, very slowly in order to achieve a pH of 7-8

Figure 6

The personnel are ready to start the neutralization of the Chloride.

3. Once the acidity was neutralized, very dry saw dust was aggregated to absorb the product. Then was placed in plastic bags. The yellow bags that can be appreciated in figure 6. Because of the high temperatures

normal in Panama, the personnel had to be shifted every 30 minutes to have a break and cool themselves.

4. Once the process finished, the personnel and tools was decontaminated by extra personnel who has only the clean up function.
5. The product was then transported to the incinerator and burned in two stages. First one at 800 ºC and the second one at around 1,150 ºC
6. The ashes were confined in concrete coffins in order to be buried at a proper site.
7. A final disposition certificate was issue to the original carrier of the acid.

This was a heavy event because the Chloropivaloyl Chloride is not an easy product. It was a tough way to get started. Even with all the mistakes that were made, the principal issue was a lesson learned and the preparedness for another event was several time fold increased.

Today there is another company specialized in all the annexes of MARPOL and OPC have an Environmental Management Department with a constant training in Hazmat and other environmental issues. Heavy links where made with GPL Laboratories.

Some other minor events occurred at the ports in Panama, some others events in everyplace of Central America like a cyanide spill when the chemical was transported to a gold mine in Guatemala. Today the specialty have to be broadened to cover not only the ports but all the transport chain and also the handling and disposition of industrial by products.

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