



Island Response System And Operations Against Oceanic Contaminants (SIROCO)

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ABSTRACT

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Prevent and/or minimize the impact of different pollutants on the coast through Island Response Systems and Operations against Oceanic Pollutants (SIROCO), which is included within the Specific Plan Pollution Accidental Marina de Canarias (PECMAR), which articulates the respective Plans Of Municipal action (PAM) and Insular (PAIN).

Keywords:

ZMER, Pollution, Fuel
Oil/Hydrocarbons, Contingency Plan.

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1. Introduction

In analyzing the problem of discharges of pollutants into the marine environment of the Canary Islands, the main idea that often arises is that there is the likelihood of spills similar to the Prestige (Galicia consequences, November 2002). According to estimates by the British ship classification society (Lloyd Shipping Register), they are about 30,000 ships touch port canary and 30,000 a year not calling. Of the total, 4,200 carrying dangerous goods, oil or petroleum products in more than 85% of cases.

On the other hand, it should be noted that the Canary Islands are eminently tourist region and depends on its shores and its environment, especially relevant for the development of its exclusive economic source. The presence of different activities related to tourism makes Canaries need to have an Integrated Management Plan of their coastal zones, ranging from the municipal level to territorial, allowing maintenance of tourist resource and ecology of the area. Given these arguments, it can be concluded that the canary coast has permanently exposed

to all kinds of aggression, (as are discharges of petroleum and other pollutants ocean), which would entail disastrous consequences for the economy, society and the environment of the whole Canary community. That is why it is especially important to the development of Contingency Plans, to ensure the protection of all the Canary coast and in case that a spill occurs, ensure proper, prompt and effective intervention, all framed in properly drafted legislation and enforceable. (Bergueiro and Domínguez, 1991)

On this basis, this paper has as its aim the development Island Response System And Operations Against Oceanic Contaminants (SIROCO), which it is included within the Specific Plan for Accidental Marine Pollution Canary Islands (PECMAR), and that articulates the respective Municipal Action Plans (MAP) and Insular (PAIN), to avoid or minimize the impact of various pollutants on the coast.

2. Analysis

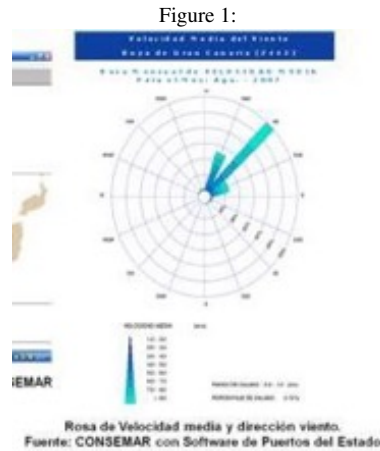
The analyzed impacts included the economics, derivatives containments by barriers, arising from recovery (by skimmers or other devices), the treatment with adsorbents and dispersants as well as those that may result from the cleaning and restoration of the coastal environment affected by the spill.

They simulated, by different models, spills of crude oil,

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derivatives, and other pollutants under different weather and oceanographic conditions, with the aim of estimating the trajectories followed, the impact zone on the coast, the variation of the spill dimensions along the time and properties of the remaining substances.

Evaporation and diffusion in the atmosphere, under different weather conditions, determining the change in concentration, as well as the risk of explosion, toxicity and public health, will be simulated. Having determined the area affected by an oil spill, the necessary measures to protect this area, be determined.

Once the pouring was contained, the type of media suitable will be selected, for recover contaminants. If it is necessary clean and restore a polluted coastal environment, the number of employees needed, time for cleaning and its cost, will be estimated.

Finally the improvements that were made, will be defined on the periodic reviews of the contingency plans. The relationship of human and material resources for the prevention and combating spills will be established. Also, this plan must be accompanied by a study of environmental, meteorological and oceanographic conditions of the area, in order to determine the possible trajectories of discharges and analyze its evolution and its possible consequences. (Bergueiro and Domínguez, 2001)

The plan is also responsible for defining the competent authorities in the processing and execution of the respective contingency plans, whether municipal, insular or territorial. He will also design a plan for continuing education, and information for all members participating in the plan (as well as the organization, implementation and subsequent evaluation of the measures defined) to ensure operation in case of emergency. You should also ensure that all assigned personnel (including the volunteers), exceeds the training courses, established by the Directorate General of Merchant Marine, relating to the fight against pollution.

On the structure and content of the study of environmental, meteorological and oceanographic conditions in the area in the evolution of possible discharges, will be assessed: (Bergueiro and Domínguez, 2002)

1. Overview of the environmental conditions of the area of

influence the spill and the geographical location and identification of the type of coast. Description of meteorological and oceanographic conditions prevailing in the area (mainly speed and wind direction and currents). Location of the areas of fishing, tourism and ecological value interest as well as the location of water resources and natural and artificial barriers.

2. Study of the effect of possible discharges and analysis of its evolution. As well as identification and description of incidents or accidents cause increased risk of polluting discharges. Determining the most likely paths based on increased risk accidents and depending on environmental conditions. Location and characteristics of possible natural or artificial barriers that provide shelter and can be an obstacle in the path of the spill. Determination of areas desirable for the concentration of the spilled substance for recovery, access areas, etc.

3. Methodology (Design)

The first to be addressed by the project will be planning and development of contingency plans, insular and municipal level, as stipulated in the PECMAR. Therefore be established, response systems and operations against ocean pollutants, within the established framework. Planning and development plans, includes a section concerning the organization and distribution of responsibilities of the various agencies involved in the management of a pollutant spill.

A study of the media and attached materials will also be made to the plan, and its inventory and verification of its proper condition, including a proposal specifying what should be the location within the community (based on greater operability and effectiveness in implementing the plan). One of the main axes that address SIROCO is the reference to training and information of all staff integrated into the plans. To achieve this goal they perform a full program of specific training for technical and administrative staff, courses and activities to ensure effective development in the work that each should play. Within this section the training plan that is offered to volunteers is also established. Since most treatment systems need a lot of labor, it is necessary to know well in advance the human resources (skilled and unskilled staff) available at the time that the spill has occurred and subsequent hours at the same.

It is intended to carry out a study of the impact of different amounts and types of mixtures of hydrocarbons and other toxic or polluting products may have on different coastal environments under the effect of various weather conditions during the spill and after the same hours.

Initially a small study of everything related to the problem of marine pollution in the vicinity of the Canary Islands. Will focus after on the study of everything related to maritime traffic and anchorage areas for ships sailing in the waters of the community, describing the types polluting substances and products transported. They described the main areas where, by traffic density or adverse weather conditions, the probability of an accident occurring is maximum. In order to perform statistical

simulations temperature, directions and intensities are obtained by winds, like data currents (directions and intensities), the possible areas where discharges may occur.

He also will work with data obtained in real-time and short-term predictions. Thus be determined trajectories that may follow different amounts and types of pollutants spilled under different weather conditions. Given that the main measures include treatment of a spill, containment, recovery and subsequent treatment and storage, will need to know your availability in the areas closest to the spill (those in the Canary Islands and that may ask to SASEMAR and other competent bodies).

To estimate the possible effects on the coast near the spill is necessary to know, in detail, the main features of the coast; also estimated the vulnerability, resilience and recovery of such coasts. In order to estimate the effect of pollutants on marine flora and fauna, they must build a database where are reflected most of the marine flora and fauna as well as the consequences that can have a spill on her. Given the problems that a spill of these characteristics can have on tourism, a study of the socio-economic impact will be made.

Since much of the spilled toxic substances are likely to evaporate or react with the environment, the spread of these will be analyze in the atmosphere near the spill and the variation with time and distance from the emission source will be estimated. With all these data may develop a Contingency Plan, through which the impact of the spill on the surrounding environment is minimized, and also serve to train all personnel in charge of the cleanup and restoration of contaminated environment. Of course it will be necessary to develop a correct ways of diffusion these plans from different media (Internet, documentaries, books, conferences, courses, etc ...) to ensure knowledge of this information to the entire population. Finally, and on a regular basis, should be carried out a review of SIROCO , taking into account the technological advances that are being made and changes in regulations; to ensure the effectiveness and operational efficiency.

Figure 2:



4. Conclusions

SIROCO establishes the contents of contingency plans for accidental marine pollution, among which are:

- Area of application.

Figure 3:

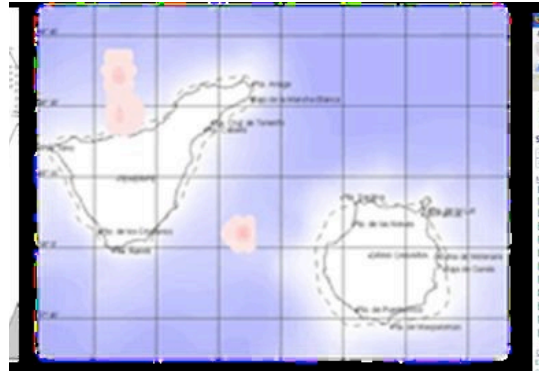
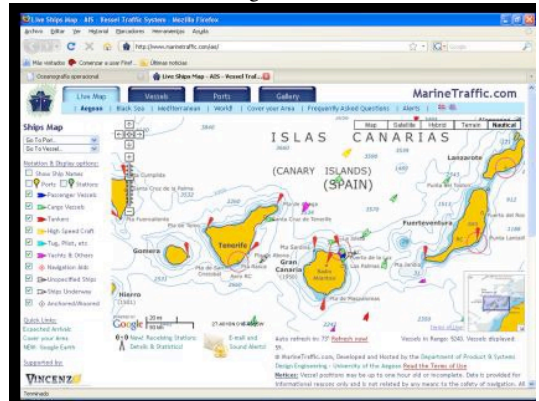


Figure 4:



- Response levels, depending on the severity of the accident.
- Composition and functions of the bodies of direction and response plan.
- Activation procedures to take measures according to the responder.
- Notification systems among the various agencies involved in the emergency.
- Coordination Plans Municipal and Island Performance and with the corresponding Territorial Plan
- Action procedure to be followed during the emergency. Communication End of Emergency.
- Inventory of available means, its location and status.
- Maintenance program of material resources
- Education and Training program staff with regular simulation exercises.
- Review Procedure SIROCO.

It would be necessary to implement mathematical models of dispersion, with a high level of complexity, to ensure that environmental qualities are achieved and prevent potential impacts

that may be generated by the issue. In addition, the simulation under different scenarios location of the diffusers, it is important to finally locate these on the site where the least impact is generated against the environment.

References

Bergueiro, J. R., Domínguez, F., (1991). Contaminación del mar por petróleo.

Bergueiro, J. R., Domínguez, F., (2001). La gestión de los derrames de hidrocarburos en el mar.

Bergueiro, J. R., Domínguez, F., (2002). Limpieza y restauración de costas contaminadas por hidrocarburos. p.o.