Desktop Exercise Report

"BLUE STAR"

INTECMAR

ACKNOWLEDGEMENT

The work described in this report was supported by the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG-ECHO) of the European Union through the Grant Agreement number 101004912 - MANIFESTS – UCPM-2020-PP-AG, corresponding to the Call objective “Enhancing prevention and protection from the effects of maritime disasters” under priority 1: “Developing response capacity for marine pollution”.

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Project Acronym	**MANIFESTS**
Project Full Title	**MAN**aging risks and **I**mpacts **F**rom **E**vaporating and gaseous **S**ubstances To population **S**afety
Gant Agreement Nr.	**101004912**
Project Website	**https://www.manifests-project.eu/**

Deliverable Nr.	**3.4**
Status (Final/Draft/Revised)	**Final**
Work Package	**3**
Task Number	**3**
Responsible Institute	**INTECMAR**
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Recommended Citation	
Dissemination Level	

Document History			
Version	**Date**	**Modification Introduced**	
		Modification Reason	**Modified by**
Final (English)	February 2023		

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Content

1. Introduction

Responding to maritime accidents can be especially challenging when dealing with hazardous and noxious substances (SNPPs or HNS) that behave like gases or evaporators. When there is an incident involving such substances, response operations must specifically consider their potential to form toxic or explosive clouds, which can affect the crew, responders, coastal civilians, and the environment.

The MANIFESTS project is supported by the European Directorate-General for Civil Protection and Humanitarian Aid Operations (ECHO) and aims to address such incidents and seek to improve response capabilities by creating innovative and innovative decision support tools and operational guidelines. Specifically, Work Package 3 seeks to enhance training and exercise capacities by focusing on those incidents that occur near the coast or a port area and that pose an added difficulty in coordinating the land and sea response.

2. Background

In November 2019, Galicia had to deal with the incident of the tanker "Blue Star" that while moving from the anchorage of Ares to the REPSOL terminal (A Coruña), to load 6000 tons of chemical products, suffered a mechanical breakdown and a fire that caused a loss of energy leaving it adrift. The ship subsequently ran aground on the rocks with 16 crew members on board. The ship was in ballast; the hull did not suffer breakage and after two failed refloating attempts the boat was removed from the rocks. The owner decided to hire the company "SMIT Salvage BV" for the salvage, and management of the cargo. The vessel had 45 tons of fuel and 60 tons of diesel on board. All fuel and oil, including lubricants, were removed and finally the ship was refloated on the afternoon of December 10, 2019, being towed to the Port of Ferrol.

While the emergency lasted, an Operational Coordination Center (CECOP) was established for the management of the emergency, in which personnel from the different institutions with competence in the different contingency plans involved in coastal incidents participated.

The evidence says that this situation could have to be faced again and even more dangerously if the ship in question loaded a harmful or potentially dangerous substance into its tanks.

Within the framework of the MANIFESTS project, it was considered that this incident can be used as a base scenario to evaluate the response capacity to this type of event and detect the necessary improvements so that the agencies responsible for response operations have the best tools to support management and coordination in the different areas of action. In this sense, on December 14, 2021, a desk exercise took place with the participation of all the agents involved in the response. A simulated case was tested to analyze the

different response actions if the damaged vessel had transported a cargo likely to cause toxic cloud. The exercise was carried out in the same place where the CECOP was constituted in the real case, the dependencies of the Maritime Captaincy of A Coruña.

3. Objectives

The main objective of the exercise was to identify, through a theoretical assumption, the best operations that could be carried out by each of the incident response groups in which a substance with the potential to generate toxic cloud is involved. Likewise, the aim was to identify those improvement actions that may lead to tools to support decision-making in similar events of the personnel included in each of the competent contingency plans in the matter.

The specific objectives were:

- Identify the priority actions to be developed and the necessary requirements to carry them out.
- Evaluate the effectiveness of response actions and the optimization of available resources.
- Identify the main weaknesses that are susceptible of improvement actions.
- Evaluate coordination and communication in the organization of the response by analyzing roles, responsibilities, and synergies.
- Identify possible improvements to the safety of responders and civilians.

4. Scenario

The simulated scenario was based on the real case that happened in 2019 but was modified to address situations that may take place in future incidents. The main modification derives from the ship carrying a load of Xylene that, although in the first moments it did not seem that it was going to be poured, as the hours go by the incident becomes complicated and a spill that generates a toxic cloud is evident. The specific scenario contemplated the following:

"*The ship C/C Blue Star (IMO 9527764) loaded on November 29, 2021, at the Plaquemine L.A. chemical terminal in Louisiana, United States, and bound for the reception facilities of the Port of Santander (N Spain), after 12 days of navigation is anchored in the Ría de Ares awaiting authorization to go to the port of discharge. After receiving the authorization, navigation begins to go to the port of destination, when due to a failure in the machine derived from a small fire in the engine room, the ship runs aground on the coast of Ares at 07:30 UTC on December 14, 2021 in Punta Miranda (43.42426N, -8.26041W). At first, the vessel reports structural damage that may affect the TK2S and TK3S tanks whose cargo is 568.89 MC and 301.95 MC of xylene respectively (see Bill of landing and ullage report). Initially, no spillage is reported, but it is feared that in a*

sea blow these tanks may be affected and their cargo dumped. The next day this circumstance occurs and over an hour the contents of the tanks are poured into the environment."

The duration of the exercise was set at 4.5 hours (see agenda Annex 1). The participants received the assumption in advance so that they could prepare their intervention thus optimizing the time of the exercise.

5. Contingency plans involved

In accordance with the provisions of the National Response System and following the events that occurred in 2019, the contingency plans involved in the incident are as follows (also see Figure 1):

National Maritime Plan: with the main responsibility in the management of the incident in relation to decisions on the ship and all operations in the maritime subsystem.

Internal maritime plans of the ports of Ferrol-San Cibrao (because the incident location is in its field of competence) and A Coruña (port to which the ship was going) with the appropriate responsibility in the operations in its field of action.

Camgal Plan, territorial action plan with activation of its action structures in the maritime subsystem under the coordination of the national maritime plan and with the main responsibility in the management of the incident in relation to decisions on actions in the terrestrial subsystem.

Plan Ribera, on alert in case the incident rises in level and supporting the territorial plan in coastal actions.

Local plan of the Council of Ares, with responsibilities in the municipal action under the coordination of the Camgal Plan.

Platerga, emergency plan of Galicia on alert in case the incident requires its activation depending on the risk to the civilian population.

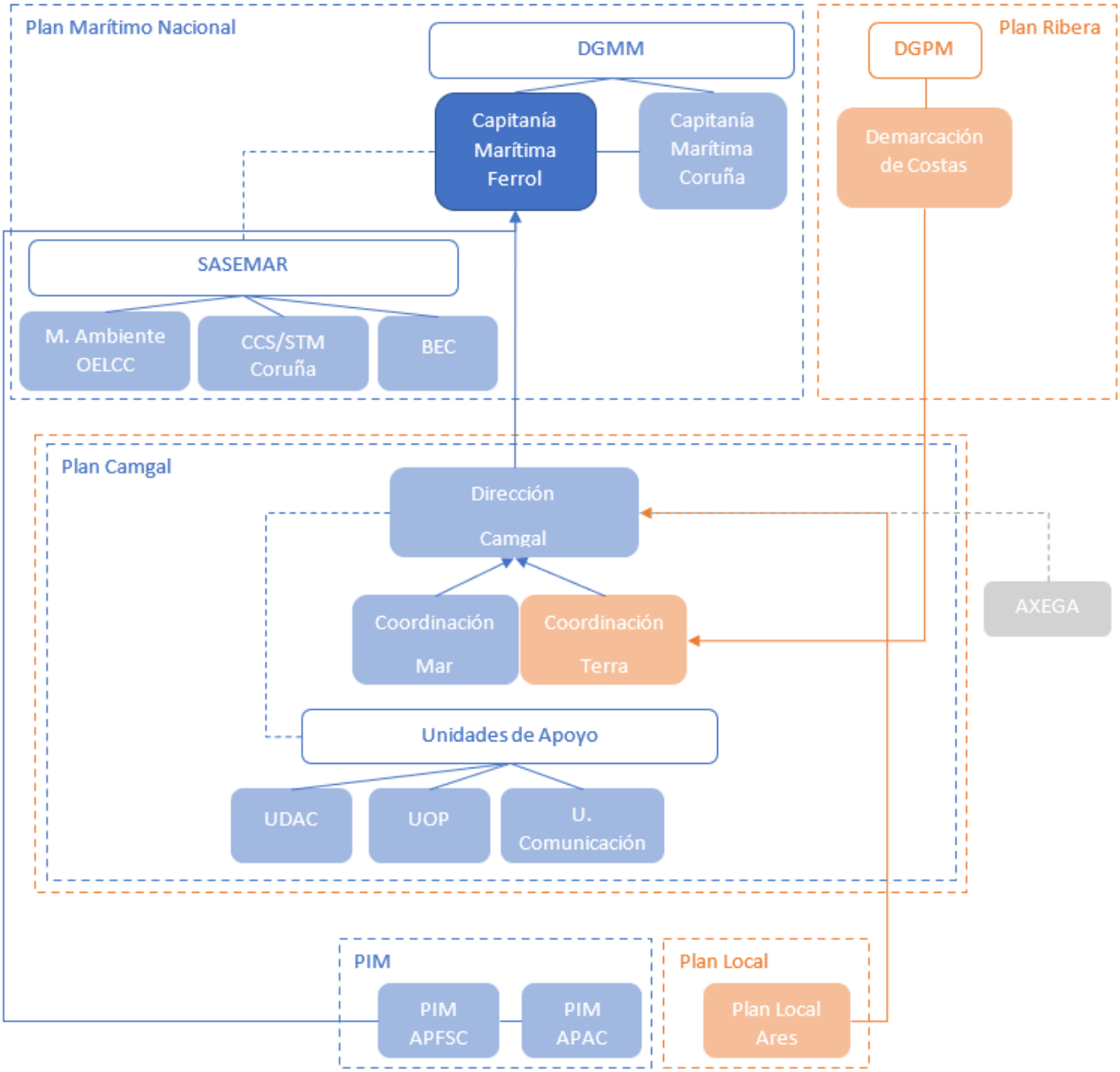

Figure 1. Integration of the contingency plans involved

Depending on the contingency plans involved, the participating groups are:

General Directorate of the Merchant Marine (DGMM) through:

- the Captaincy of Ferrol (CF) in charge of the management of the incident for running this in its field of competence
- the Captaincy of Coruña (CC), whose scope of action is bordering the place of the incident, and which hosts the headquarters of the exercise.

Sociedad de Salvamento y Seguridad Marítima (SASEMAR) through:

- CCS Coruña, as the competent coordination centre in the location of the incident.
- CCS Fisterra, whose scope of action is bordering on the place of the incident.

- Environment, Special Operations and Pollution Response Area, as a support unit in chemical incidents.
- Strategic base of Coruña (BEC), as manager of the means of combating marine pollution

Port Authority of Ferrol San Cibrao through the:
- Safety, Security and Environment Division

Port Authority of A Coruña through:
- Sustainability Department

XUNTA DE GALICIA through:
- Coastguard Service as responsible for the Camgal Plan
    - Search, Maritime Rescue and Combating Pollution Service, as responsible for the coordination of operations at sea of the Camgal Plan
- General Subdirectorate of Environmental Coordination, responsible for the coordination of ground operations of the Camgal Plan
- INTECMAR, responsible for the coordination of the support units for the Camgal Plan, the Close Observation Unit (UOP) and the Documentation and Scientific Support Unit (UDAC)
- Axega, Galician emergency agency, as a support unit for the Camgal Plan
- CETMAR: as a support unit for the Camgal Plan and coordinator of work package 3 of the MANIFESTS project

Directorate-General for the Protection of the Sea (DGPM) through:
- Demarcation of Coasts of the province of A Coruña, as responsible for the coordination of the support work of the Ribera Plan to the Camgal Plan

Ares Municipality:
- Mayor
- Chief of Local Police

6. Development of the exercise

The duration of the exercise was set at 4.5 hours (see Agenda in Annex 1). The participants received the assumption in advance so that they could prepare their intervention thus optimizing the time of the exercise. Furthermore, the process of activating and notify the contingency plans involved in the response was not contemplated and it was assumed that this process had taken place correctly. On the other hand, in the documentation provided to the participants, in addition to the informative data that were supposedly received from the damaged vessel (see Annex 2 Bill of Landing and Annex 3 Ullage Report), cards were included that reflected some questions that the participants had to assess (see Annex 4).

All the agencies with competence in the response were represented in the exercise with the personnel who in a real case would oversee the response operations in each of the fields of competence of the different contingency plans involved.

During the exercise, the five topics included in the files provided in the documentation (information collection, actions at sea, actions on land, monitoring, post-incident) were addressed so that all the groups presented their counterparts around each theme and engaged in a subsequent analysis for each of them.

All contributions were collected by the organizing group participating in the project (Cetmar and Intecmar) and noted those aspects that were indicated as a possible basis for an improvement action.

Once the exercise was finished, an analysis of the information collected was carried out and the development of some improvement actions that were identified and that can be carried out from the project began.

7. Analysis of the exercise

The documentation provided to the participants of the exercise contained cards that include some aspects to be considered during the emergency. Each of the participants evaluated those aspects in their field of action and analysed the capacity to carry out the different actions and suggest the actions that can be improved. The exercise focused on the evaluation of strategies, targets, and objectives to respond to the incident and evaluation of all aspects that could be cause for improvement to increase the existing response capacity.

The topics addressed were:

Information collection: What information is needed, who can provide it, how you provide it, and to whom.

First actions: Take the first steps to prevent the situation from worsening, especially for risks of explosion, fire, reaction with other substances (e.g., water, air), release of toxic cloud, etc., and to stop or reduce the source of the spill.

Response in the accident scenario: Once the response strategy has been established, a series of actions will be carried out aimed at protecting both people and flora and fauna, monitoring the polluting episode, interventions on damaged ships, combating pollution and to the logistical organization of the incident.

Post-accident management: Waste management, restoration of affected areas, documentation, registration, and recovery of expenses incurred, monitoring of the situation after the incident.

Once all the contributions of the participants were collected, the opportunities for improvement that could be accommodated for a more efficient response were identified. Some of these opportunities were translated into possible proposals for improvement actions that can be carried out in the context of the project, differentiating two areas, on the one hand, those actions restricted to the area of Galicia and on the other, those actions that may have a global scope and that could be framed in a joint action of the entire project consortium.

The Annex 5 "Proposals for improvement actions" contains the tables that collect the information referred to in the previous paragraph.

8. Conclusions

The participation of all the institutions with competences in a real case like the one simulated during the exercise offered the opportunity to have a global analysis of the response given by each group. Thus, made easier the identification of opportunities for improvement.

The duration of the exercise did not allow to address in depth all the issues raised, however, it was possible to highlight the main difficulties that arise to the managers of the response in a case like this.

The high number of contingency plans involved in the exercise was a good opportunity to assess the interaction between the two subsystems (at-sea response and land-based response) into which the response is divided according to the National Response System and the coordination between the different levels of response according to their field of competence. In this sense, one of the opportunities for improvement identified was the simplification and strengthening of the exchange of information both between response subsystems and between levels (port, local, regional, and national).

The expressions of interest on the part of all participants in carrying out more exercises of this type based on real cases that occurred on the European coasts, confirmed the usefulness of addressing the different aspects of the response in a calm and multilateral manner.

9. Annexes

Annex 1- Agenda

Annex 2- Bill of Landing

Annex 3- Ullage report

Annex 4- Information for participants (general + factsheets)

Annex 5- Information for participants by the UOP about the spill

Annex 6- Information for participants by the UDAC about the environmental resources

Annex 7- Proposal for improvement actions

10. Annex 1

DESK EXERCISE

“BLUE STAR”

Agenda

Date: 12/14/2021

Time: 9:30-14:00

Location: Maritime Captaincy of A Coruña

9:15-9:30 Reception participants

9:30-9:50 Explanation of the exercise

9:50-10:20 Fact sheet 1 Information gathering

10:2 0-11:20 Tab 2 Response at sea

11:20-11:40 Break

11:4 0-12:40 Sheet 3 Response on shore

12:4 0-13:10 Tab 4 Monitoring

13:10-13:30 Sheet 5Post-incident actions

13:30-14:00 Conclusions

11. Annex 2

BILL OF LADING

Reference No.: **3165E24-T1404** B/L No: **304DOW - P2021**

Shipper

DOW CHEMICAL COMPANY NORTH AMERICA
21255 - 1 - Plaquemine
LA 70764 United States

Consignee

TO THE ORDER

Notify address

TO THE ORDER

Vessel	IMO number	Port of loading
C/C BLUE STAR	**9527764**	**Plaquemine, LA.**

Port of discharge

ONE OR MORE SAFE PORT(S), SPAIN NORTH COAST

Shipper´s description of goods	Gross weight
XYLENE SOLVENT GRADE	**7,608.79 MT** (1) (1) As vessel figures

OCEAN CARRIAGE STOWAGE: **4 W**

"CLEAN ON BOARD"
"FREIGHT PAYABLE AS PER CHARTER PARTY"

(Of which **NIL** on deck at Shipper s risk, the Carrier not being responsable for loss or damage howsoever arising)

Received on account of freight: Time used loading: ...0... days ...20... hours.	**SHIPPED** at the port of Loading in apparent good order and condition on board the vessel for carriage to the port of Discaharge or so near thereto as may safety get the goods specified above. Quality, quantity, condition, contens and value unknown. **IN WITNESS** whereof the Master or Agent of the said Vessel has signed the number of Bills of Lading inicate below **all** on this date, any one of which being accomplehed the others shall be void.
Freight payable as: **AS PER CHARTER PARTY**	Place and date of issue: **Plaquemine, Louisiana. UNITED STATES.** **DATED November 29, 2021**
Number of original Bs/L **/// --- 3 --- ///**	Signature **K&C SHIPPING INC. AS AGENTS ONLY, FOR AND ON BEHALF OF MASTER OF MT "BLUE STAR"**

Code name: "CONGENBILL", Edition 2016. TO BE USED WITH CHARTERS PARTIES

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12. Annex 3 (1/3)

C/C BLUE STAR IMO 9527764

Ullage report: 18/2021

Date: 29/11/2021	Port: Plaquemine, Louisiana	Terminal: DOW Chemical Company

TK1P		Volume: CM
Ullage: cm	27,3	492,94
Water:	Nil	0,00
Average Temperature: C		25,0
Grade:	Xylene	492,94

TK1S		Volume: CM
Ullage: cm	26,9	493,09
Water:	Nil	0,00
Average Temperature: C		25,0
Grade:	Xylene	493,09

TK2P		Volume: CM
Ullage: cm	27,1	568,93
Water:	Nil	0,00
Average Temperature: C		24,9
Grade:	Xylene	568,93

TK2S		Volume: CM
Ullage: cm	27,2	
Water:	Nil	0,00
Average Temperature: C		24,9
Grade:	Xylene	568,89

TK3P		Volume: CM
Ullage: cm	26,5	302,06
Water:	Nil	0,00
Average Temperature: C		25,1
Grade:	Xylene	302,06

TK3S		Volume: CM
Ullage: cm	27,0	301,95
Water:	Nil	0,00
Average Temperature: C		25,2
Grade:	Xylene	301,95

TK4P		Volume: CM
Ullage: cm	27,1	611,23
Water:	Nil	0,00
Average Temperature: C		24,9
Grade:	Xylene	611,23

TK4S		Volume: CM
Ullage: cm	27,3	611,13
Water:	Nil	0,00
Average Temperature: C		25,0
Grade:	Xylene	611,13

Chieff Officer ullage report 2 grades : V.3 Julio 2020

Blue Star Chemical Carriers LTD, 99 ArchBishop Street. Valetta. Malta

Annex 3 (2/3)

TK5P		Volume: CM
Ullage: cm		XXXXXX
Water:		
Average Temperature: C		
Grade:		NIL

TK6P		Volume: CM
Ullage:	25,9	766,33
Water:	Nil	0,00
Average Temperature: C		25,0
Grade:	Xylene	**766,33**

TK7P		Volume: CM
Ullage: cm	27,0	306,27
Water:	Nil	0,00
Average Temperature: C		25,3
Grade:	Xylene	**306,27**

TK8P		Volume: CM
Ullage: cm	26,4	612,53
Water:	Nil	0,00
Average Temperature: C		25,0
Grade:	Xylene	**612,53**

TK9P		Volume: CM
Ullage: cm	26,1	779,51
Water:	Nil	0,00
Average Temperature: C		25,2
Grade:	Xylene	**779,51**

TK5S		Volume: CM
Ullage: cm		XXXXXX
Water:		
Average Temperature: C		
Grade:		NIL

TK6S		Volume: CM
Ullage: cm	26,6	765,93
Water:	Nil	0,00
Average Temperature: C		24,8
Grade:	Xylene	**765,93**

TK7S		Volume: CM
Ullage: cm	27,0	306,27
Water:	Nil	0,00
Average Temperature: C		25,2
Grade:	Xylene	**306,27**

TK8S		Volume: CM
Ullage: cm	26,7	612,38
Water:	Nil	0,00
Average Temperature: C		25,2
Grade:	Xylene	**612,38**

TK9S		Volume: CM
Ullage: cm	27,0	778,97
Water:	Nil	0,00
Average Temperature: C		25,0
Grade:	Xylene	**778,97**

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Annex 3 (3/3)

DTK10P		Volume: CM
Ullage: cm		XXXXXX
Water:		
Average Temperature: C		
Grade:		NIL

DTK10S		Volume: CM
Ullage: cm		XXXXXX
Water:		
Average Temperature: C		
Grade:		NIL

Total Volume Grade: Xylene	8878,41	Average temperature Grade:	25,0
Total Volume Grade :		Average temperature Grade:	

Corrected Volume at 15: Grade Xylene	8705,71	Density at 15: Grade Xylene	0,874
Corrected Volume at 15: Grade		Density at 15: Grade:	

Total Mtons Grade: Xylene	7608,79
Total Mtons Grade :	NIL
Total Cargo O/B in Mtons	7608,79

FRANK PALLONE JR.

By Survey Company
PACMARINE USA INC.

Chief Officer C/C BLUE STAR

Chieff Officer ullage report 2 grades : V.3 Julio 2020

Blue Star Chemical Carriers LTD, 99 ArchBishop Street. Valetta. Malta

13. Annex 4

DESK EXERCISE

“BLUE STAR”

Date: 12/14/2021

Time: 9:30-14:00

Location: Maritime Captaincy of A Coruña

Co-funded by the European Union Civil Protection

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Content

Introduction

Responding to maritime accidents can be especially challenging when dealing with hazardous and noxious substances (SNPPs or HNS) that behave like gases or evaporators. When there is an incident involving such substances, response operations have to specifically consider their potential to form toxic or explosive clouds, which can affect the crew, responders, coastal civilians and the environment.

The MANIFESTS project is supported by the European Directorate-General for Civil Protection and Humanitarian Aid Operations (ECHO) and aims to address such incidents and seek to improve response capabilities by creating innovative and innovative decision support tools and operational guidelines. Specifically, Work Package 3 seeks to enhance training and exercise capacities by focusing on those incidents that occur near the coast or a port area and that pose an added difficulty in coordinating the land and sea response.

Background

In November 2019, Galicia had to deal with an incident of the tanker "Blue Star" that while moving from the anchorage of Ares to the REPSOL terminal (A Coruña), to load a cargo of 6000 tons of chemical products, suffered a mechanical breakdown and a fire that caused a loss of energy leaving it adrift. The ship subsequently ran aground on the rocks with 16 crew members on board. The ship was in ballast; The hull did not suffer breakage and after two failed refloating attempts the boat was removed from the rocks. The owner decided to hire the company "SMIT Salvage BV" for the salvage, and management of the cargo. The vessel had 45 tons of fuel and 60 tons of diesel on board. All fuel and oil, including lubricants, were removed and finally the ship was refloated on the afternoon of December 10, 2019 being towed to the Port of Ferrol.

While the emergency lasted, a POPRC was established for the management of this in which personnel from the different institutions with competences in the different contingency plans involved in coastal incidents participated.

The evidence says that this situation could have to be faced again and even more dangerously in the event that the ship in question loaded a harmful or potentially dangerous substance into its tanks.

Within the framework of the MANIFESTS project, it has been considered that this incident can be used as a base scenario with which to evaluate the response capacity to this type of event and detect the necessary improvements so that the agencies responsible for response operations have the best tools to support management and coordination in the different areas of action.

Objectives

The main objective pursued by this exercise is to identify, through a theoretical assumption, the best operations that could be carried out by each of the incident response groups in which a substance with the potential to generate toxic cloud is involved. Likewise, the aim is to identify those improvement actions that may lead to tools to support decision-making in similar events of the personnel included in each of the competent contingency plans in the matter.

Specifically, it is attempted:

- Identify the priority actions to be developed and the necessary requirements to carry them out
- Evaluate the effectiveness of response actions and the optimization of available resources
- Identify the main weaknesses that are susceptible to improvement actions
- Evaluate coordination and communication in the organization of the response by analyzing roles, responsibilities and synergies
- Identify possible improvements to the safety of responders and civilians

Scenario

The theoretical scenario is based on the real case that happened in 2019 but has been modified to address situations that may take place in future incidents. The main modification derives from assuming that the ship would carry a load of Xylene that, although in the first moments it did not seem that it was going to be poured, as the hours go by the incident becomes complicated and a spill that generates a toxic cloud is evident.

The ship C/C Blue Star (IMO 9527764) loaded on November 29, 2021 at a Plaquemine L.A. chemical terminal in Louisiana, United States, and bound for the reception facilities of the Port of Santander (N Spain), after 12 days of navigation is anchored in the Ares estuary awaiting unloading port. After receiving authorization, navigation begins to go to the port of destination, when due to a failure in the machine derived from a small fire in the engine room, the ship runs aground on the coast of Ares at 07:30 UTC on December 14, 2021 in Punta Miranda (43.42426N, -8.26041W).

At first, the vessel reports structural damage that may affect the TK2S and TK3S tanks whose cargo is 568.89 MC and 301.95 MC of xylene respectively (see Bill of landing and ullage report).

Initially, no spillage is reported, but it is feared that in a sea blow these tanks may be affected and their cargo dumped. The next day this circumstance occurs and over an hour the contents of the tanks are poured into the environment.

Initially it is estimated that the shipowner will hire a company to take charge of the situation and therefore, it is necessary to define the conditions that will be required both in relation to the ship and to the work on the coast.

Once the spill is known, the company renounces to take charge and it is the Spanish authorities who undertake the response operations.

Contingency plans involved

In accordance with the provisions of the National Response System and also following the events that occurred in 2019, the contingency plans involved in the incident are as follows (see tb Figure 1):

National Maritime Plan: with the maximum responsibility in the management of the incident in relation to decisions on the ship and all operations in the maritime subsystem.

Internal maritime plans of the ports of Ferrol-San Cibrao (because the location is in its field of competence) and A Coruña (port to which the ship was going) with the appropriate responsibility in the operations in its field of action.

Camgal Plan, territorial action plan with activation of its action structures in the maritime subsystem under the coordination of the national maritime plan and with the maximum responsibility in the management of the incident in relation to decisions on actions in the terrestrial subsystem.

Plan Ribera, on alert in case the incident rises in level and supporting the territorial plan in coastal actions.

Local plan of the Council of Ares, with responsibilities in the municipal action under the coordination of the Camgal Plan.

Platerga, emergency plan of Galicia on alert in case the incident requires its activation depending on the risk to the civilian population.

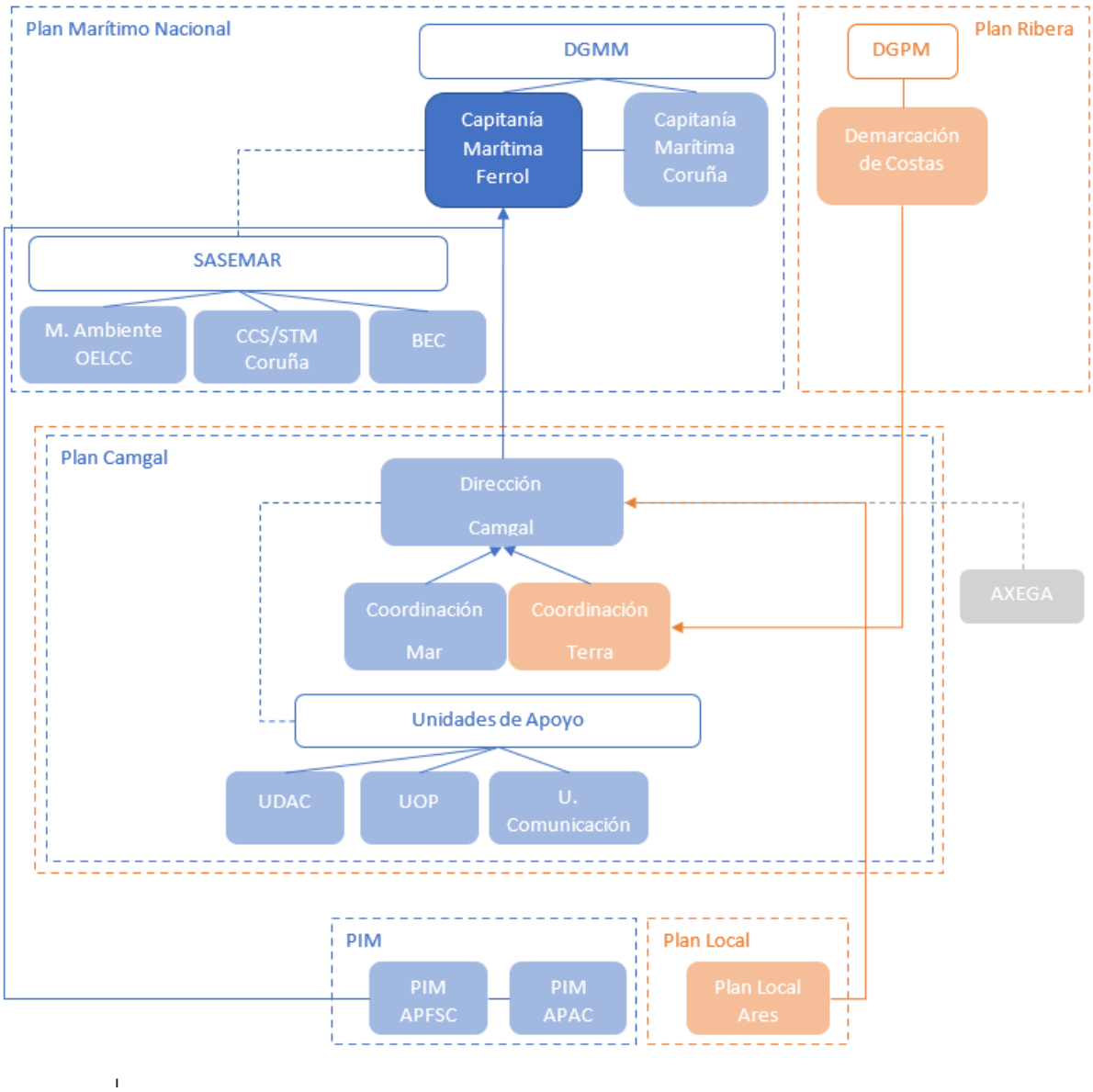

Figure 1. Integration of the contingency plans involved

Depending on the contingency plans involved, the participating groups are:

General Directorate of the Merchant Marine (DGMM) through:

- the Captaincy of Ferrol (CF) in charge of the management of the incident for running this in its field of competence
- the Captaincy of Coruña (CC), whose scope of action is bordering the place of the incident, and which hosts the headquarters of the exercise.

Sociedad de Salvamento y Seguridad Marítima (SASEMAR) through:

- CCS Coruña, as the competent coordination centre in the location of the incident.
- CCS Fisterra, whose scope of action is bordering on the place of the incident.
- Environment, Special Operations and Pollution Response Area, as a support unit in chemical incidents.
- Strategic base of Coruña (BEC), as manager of the means of combating marine pollution

Port Authority of Ferrol San Cibrao through the:
- Safety, Security and Environment Division

Port Authority of A Coruña through:
- Sustainability Department

XUNTA DE GALICIA through:
- Coastguard Service as responsible for the Camgal Plan
    - Search, Maritime Rescue and Combating Pollution Service, as responsible for the coordination of operations at sea of the Camgal Plan
- General Subdirectorate of Environmental Coordination, responsible for the coordination of ground operations of the Camgal Plan
- INTECMAR, responsible for the coordination of the support units for the Camgal Plan, the Close Observation Unit (UOP) and the Documentation and Scientific Support Unit (UDAC)
- Axega, Galician emergency agency, as a support unit for the Camgal Plan
- CETMAR: as a support unit for the Camgal Plan and coordinator of work package 3 of the MANIFESTS project

Directorate-General for the Protection of the Sea (DGPM) through:
- Demarcation of Coasts of the province of A Coruña, as responsible for the coordination of the support work of the Ribera Plan to the Camgal Plan

Ares Municipality:
- Mayor
- Chief of Local Police

Development of the exercise

The general idea is that the exercise covers the following scheme:

Where scenario 1 would reflect a situation in which the ship does not cause a spill and only the management of the cargo and the ship itself has to be carried out.

Scenario 2 would reflect a situation where there is a small spill that can affect the crew.

Finally, scenario 3 would reflect a spill of considerable dimensions and toxic cloud formation.

Considering time constraints, the transition from scenario 1 to 3 will be gradual over the duration of the exercise that will try to jointly address the actions to be carried out in each of the situations.

Activation of contingency plans and notification

Considering that the objectives of the exercise focus on response operations, it will be assumed that:

- After receiving the notice of the incident issued by the captain of the ship through the CCS Coruña, the Port Authority of Ferrol San Cibrao, activates the PIM notifying it through the CCS to the maritime authority and informing that the means available in the area are not sufficient to face the contingency.
- After the notification of the incident through the CCS Coruña, the maritime authority, in this case the Maritime Captain of Ferrol, activates the National Maritime Plan in Emergency Phase, Situation 1 because the available means of the PIM are insufficient in accordance with article 11, 2.a) of Order FOM / 1793/2014.
- As described in article 19 of Order FOM/1793/2014, the CCS Coruña following the instructions of the Maritime Captain, will send the appropriate notifications: to the CNCS, to the Maritime Captain of Coruña due to threat of its area of action, to the delegate of the Government in Galicia, to the director of the Camgal Plan (through the Operations Room of Gardacostas de Galicia), the DG for Sustainability of the Coast and Sea, the DG for Civil Protection and Emergencies and the Department of National Security of the Presidency of the Government.

- Once the notification of the incident has been received, the director of the Camgal Plan activates the Camgal Plan in the emergency phase, medium level and indicates to the Chamber the notification to the local authorities of the Council of Ares requesting the activation of its local plan or, failing that, of its PEMU.
- After receiving notification of the incident through 112, the DG of Emergencies and Interior of Galicia decides to activate the Platerga in the alert phase.

Action procedure

In the real case that took place in 2019, the shipowner hired the services of the company Smit Salvage, however, as the intention of the exercise is to evaluate the response capacity to an event of these characteristics by the organizations with scope of action in Galicia, the two situations described below will be assumed in this regard:

- There is a contracted company and therefore it is necessary to define, each participant in its field, the instructions to transmit to the contracted company to act in the area
- There is no external company that can carry out the response work and, therefore, each participant in it must identify what and how to proceed.

Response sheets

The aim of all actions to be taken is to eliminate or reduce pollution, bearing in mind that the priority will always be to save lives at risk and preserve the health of the actors involved in the response. These actions can be grouped into the following stages that, although usually sequential, can overlap in time.

- Notification of the accident.
- Collection of Information.
- Decision making, aimed at defining the best strategy to eliminate or reduce pollution.

Considering time constraints, notification actions are considered to have been taken, but each participant must ensure that they are aware of them. It is worth highlighting the aspects of coordination between action plans activated all together.

The following files include some aspects to consider during the emergency. Each of the participants must evaluate those aspects in their field of action, analyze the capacity to carry out the different actions and suggest the actions that can be improved.

The exercise will focus on the evaluation of strategies, goals, and objectives to respond to the incident and thus evaluate all those aspects that may be cause for improvement in order to increase the existing response capacity.

Action sheets that focus on:

Information collection: What information is needed, who can provide it, how you provide it, and to whom.

First actions: Take the first steps to prevent the situation from worsening, especially for risks of explosion, fire, reaction with other substances (e.g. water, air), release of toxic cloud, etc., and to stop or reduce the source of the spill.

Response in the accident scenario: Once the response strategy has been established, a series of actions will be carried out aimed at protecting both people and flora and fauna, monitoring the polluting episode, interventions on damaged ships, combating pollution and to the logistical organization of the incident.

Post-accident management: Waste management, restoration of affected areas, documentation, registration and recovery of expenses incurred, monitoring of the situation after the incident.

Information Gathering

Fact sheet 1

During a chemical contingency, it is essential that both crisis managers and all actors in the response have all the information related to the incident in the most up-to-date, easy and fastest way. The following describes some aspects of information collection to consider

Required information	Who, How and to whom	Proposal for improvement
State of the ship		
Product (type, quantity, characteristics, toxicity, etc.)		
Necessary PPE		
Current ocean-weather conditions and forecast in the coming hours		
Spill drift prediction		
Population likely to be affected		
Resources at risk of being affected		

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Response at sea

Fact sheet 2

The first actions will be related to the rescue and then to stop and contain the possible spill		
Performances	**Who, How, in How Long**	**Proposal for improvement**
Is it possible to carry out the evacuation actions of the crew, by what means (air, seafar)?		
Establishment of an immediate danger zone, including navigation (sea and air) and possibly population (evacuation or shelter on site). Exclusion zones.		
Is there a risk of explosion and toxic cloud?		
Is it possible to cool the tanks adjacent to those affected?		
Is it possible to bring down the toxic cloud? Foam over spill, water curtain, etc.		
Is it possible to contain the spilled substance?		
PPEs available?		
Is there a possibility to tow the vessel? Where?		
Can the cargo be transferred? Fireproof equipment. To which vessel?		
If a company is in charge of these tasks, what should be required?		
Coordination of sea-land operations		

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Response on shore

Fact sheet 3

The first actions will be related to the protection of personnel and then to stop and contain the possible spill		
Performances	**Who, How, in How Long**	**Proposal for improvement**
Are there fire crews or specialized personnel on land that can act on the ship?		
Is there capacity to transfer the ship's cargo ashore?		
How is the transferred product transported by land and where?		
Access restrictions to the affected area		
Information, confinement and evacuation of the affected population. Evacuation routes		
Authorization of actions on land		
¿PPEs available?		
Intermediate deposits		
Establishment of areas of action		
If a company oversees these tasks, what should be required?		
Actions for the protection of fauna and flora		
Coordination of land-sea operations		

Monitoring

Fact sheet 4

Follow-up should be done immediately after the incident and at different levels to perform zoning, situation assessment and input into the information gathering process. Once the response has started, monitoring should continue throughout the process.		
Performances	**Who, How, in How Long**	**Proposal for improvement**
Is aerial evaluation possible?, drones?		
Is there a capacity to have explosimeters and gas detectors?		
Is there a possibility of monitoring the substance discharged?		
Is there a possibility to control pressures in pumping operations?		
Monitoring of affected fauna and flora		
Sampling and analysis		

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Post-accident

Fact sheet 5

There are numerous aspects to consider once the first response actions are completed.		
Performances	**Who, How, in How Long**	**Proposal for improvement**
Treatment of waste from actions on land and sea		
Management of the transferred substance		
Recovery of affected areas		
Collection of facts and expenses, initiation of disciplinary proceedings		
Actions to improve activated contingency plans		

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Attachments and additional information

Ullage report

Bill of Landing

UDAC (example of information that would contribute to a contingency of this type)

UOP (example of information that would contribute to a contingency of this type)

Xylene S Data Sheet & Safety Data Sheet

Xylene Chemical response guide (http://wwz.cedre.fr/en/Resources/Publications/Chemical-Response-Guides/Xylenes)

Marine HNS Response Manual (https://helcom.fi/media/publications/Marine-HNS-Response-Manual.pdf)

Mariner Knowledge Tool (http://knowledgetool.mariner-project.eu/)

Mariner project (http://mariner-project.eu/)

Manifests project (https://manifests-project.eu/)

14. Annex 5

Ocean-meteorological conditions

DESK EXERCISE

“BLUE STAR”

Close Observation Unit - INTECMAR

Co-funded by the European Union Civil Protection

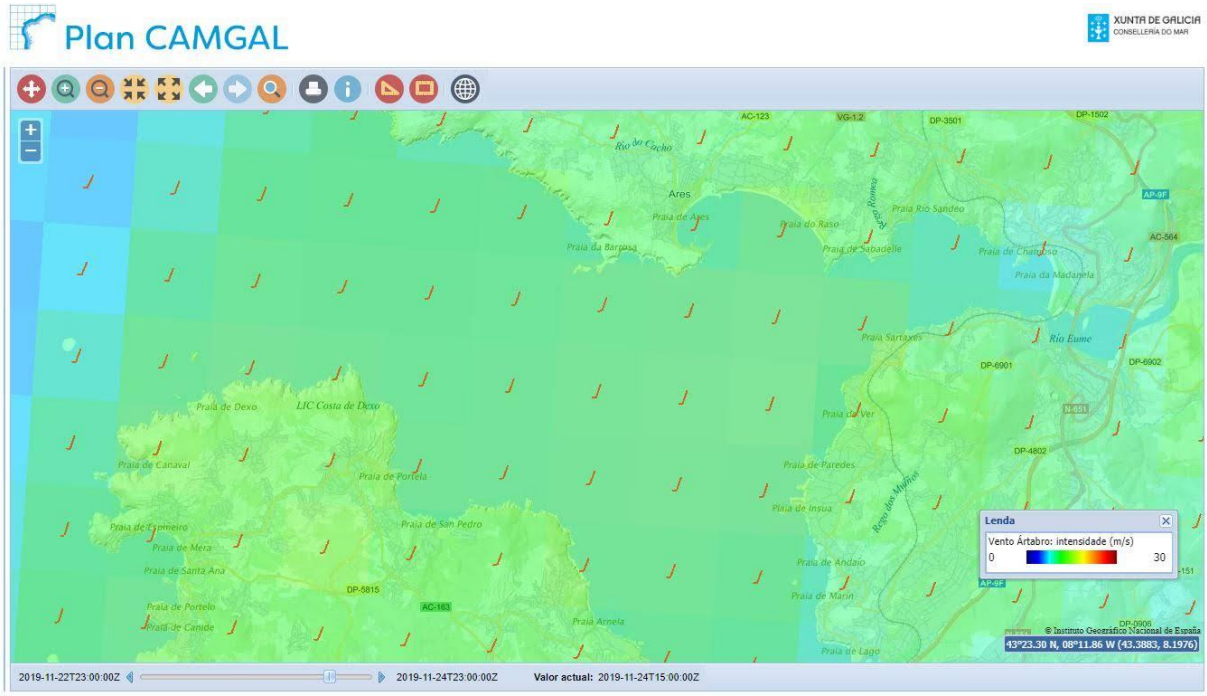
Co-funded by the European Union Civil Protection

Content

Meteorological Ocean Information available

Atmospheric prediction:

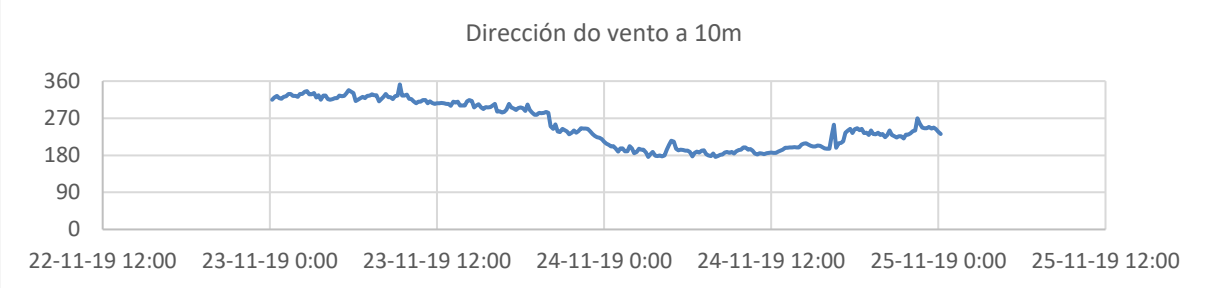
Time maps with resolution of 1 km for the area:



Example of wind map (intensity in color) for the area available in the Camgal Plan viewer.

Atmospheric observation

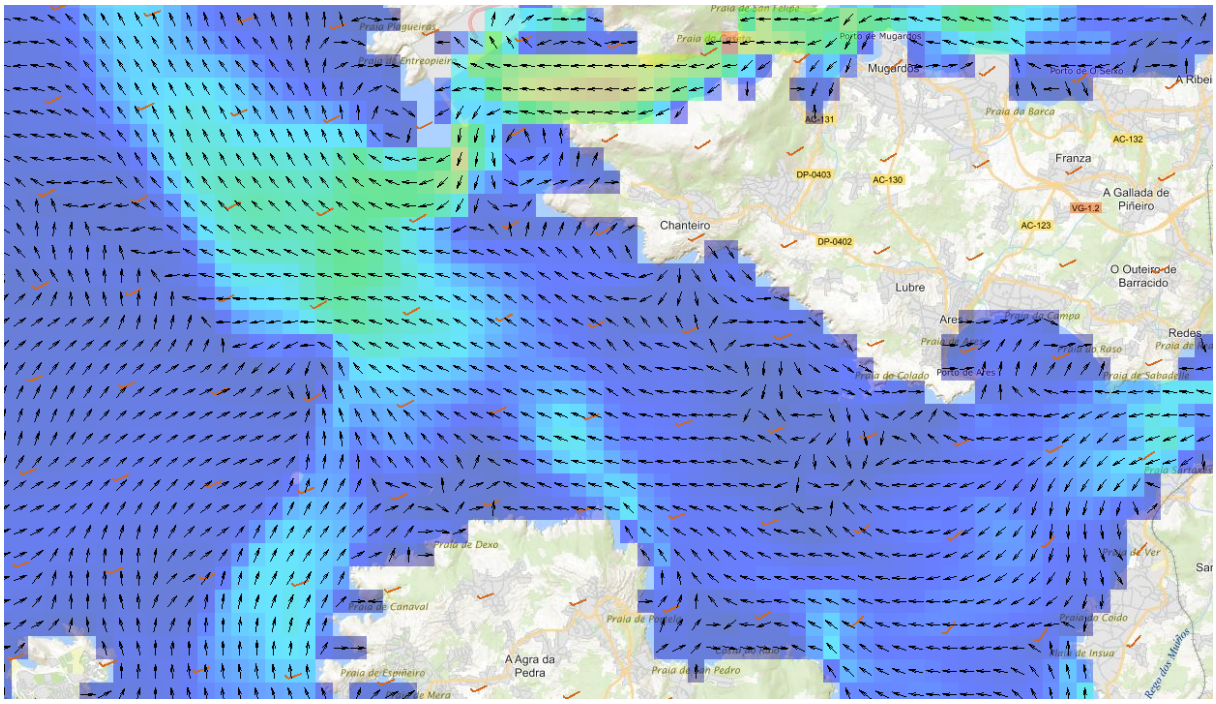
Nearby meteorological stations with variables such as wind, temperature, hum, etc.: CIS Ferrol, Coruña Dique, Coruña Torre de Hércules, O Val (Narón), Aldea Nova (Narón).



Example of a time series of the wind during November 23 and 24, 2019 measured in the Barrié de la Maza Dam

Oceanographic prediction

Time maps of currents, water temperature, salinity and tidal rise, with resolution of 250 m



Example of current map (intensity in color) for the area available in the Camgal Plan viewer.

Other information of interest

Tide Table:

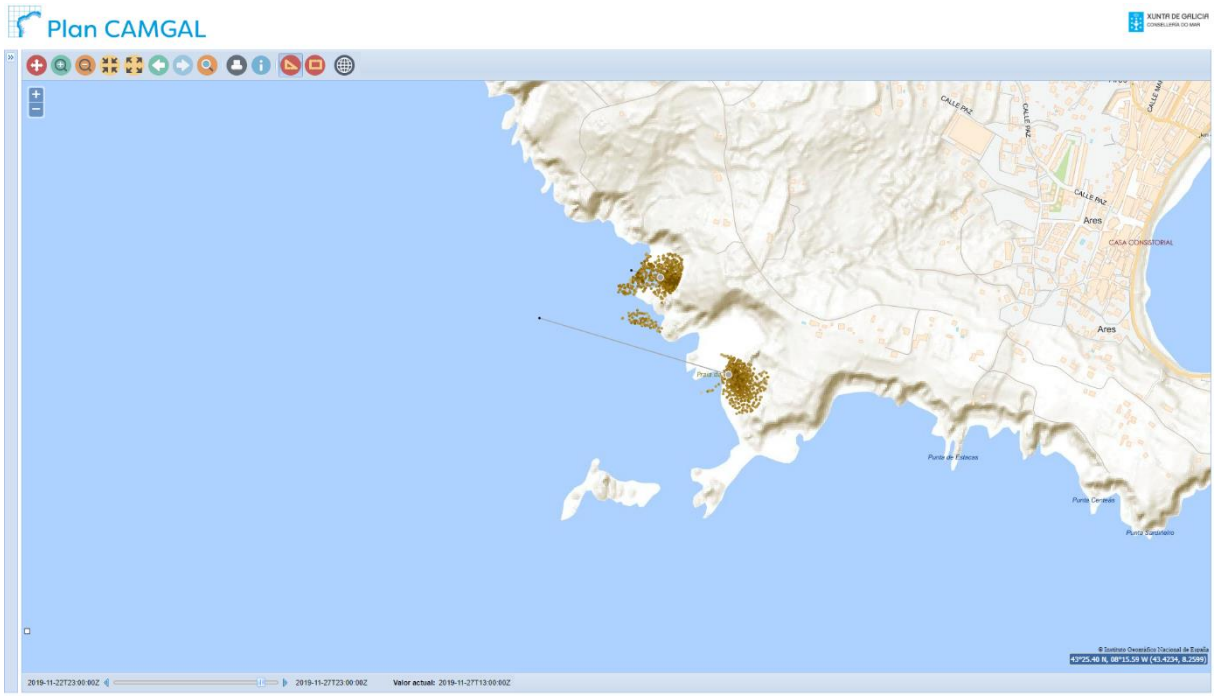
- Iowa		
23/11/2019	**Hour**	**Height**
Preamar	01:13	3.4
Baixamar	07:13	1.0
Preamar	13:32	3.7
Baixamar	19:48	0.7

Orto and Ocaso for 23/11/2019: 8:36 and 18:03 official time

Spill simulations

Hydrocarbon Spill

The simulations are performed with the MOHID model for hydrocarbons.



Example of prediction of hydrocarbon spilled during the accident. Simulation performed during the real Blue Star accident.

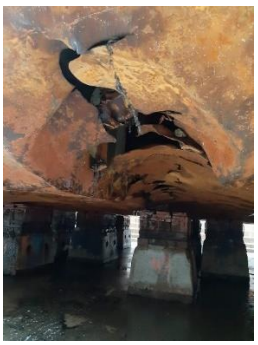
Toxic Cloud Exclusion Areas

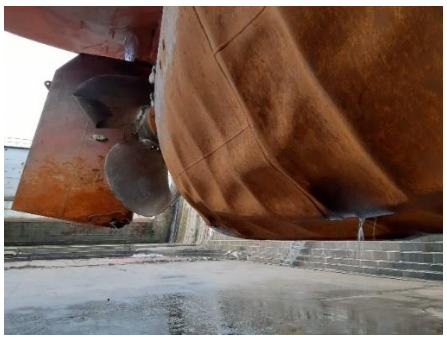
The simulations were performed with NOAA's ALOHA model

Characteristics of the spill

Poured	
Poured	Xyleno
Quantity	1000 m^3/hour for 1 hour
State	liquid
Source temperature	Seawater temperature (15 ºC)

These data have been assumed taking the worst situation due to the possibility of a breakage of tanks 2 and 3 with approximately a load of 1000 m3 for one hour. The following images show the condition of the Blue Star's helmet.





Not knowing when the hull may break simulates the spill at 3 different times, with the greatest wind change. The exclusion zones predicted by the ALOHA model for both toxicity limit and flammability are shown below.

Situation 1: 23-11-2019 12:00 Wind 10 m/s of 305º

Toxicity:

Red area: 1.5 km (900 ppm = IDLH)

Flammability:

Red Area: 444 m (6600 ppm = 60% LEL = Flame Pockets) Yellow Area: 1.3 km (1100 ppm = 10% LEL)

Situation 1: 23-11-2019 19:00 Wind 7.5 m/s of 275º

Toxicity:

Red area: 1.8 km (900 ppm = IDLH)

Flammability:

Red Area: 575 m (6600 ppm = 60% LEL = Flame Pockets) Yellow Area: 1.6 km (1100 ppm = 10% LEL)

Situation 1: 24-11-2019 12:00 Wind 15 m/s of 190º

Toxicity:

Red area: 1.2 km (900 ppm = IDLH)

Flammability:

Red Area: 328 m (6600 ppm = 60% LEL = Flame Pockets) Yellow area: 1.1 km (1100 ppm = 10% LEL)

15. Annex 6

Support Information

DESK EXERCISE

“BLUE STAR”

Scientific Documentation and Support Unit - INTECMAR

Co-funded by the European Union Civil Protection

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Content

General information about the vessel

Vessel identification		Technical data	
Name	BLUE STAR	Gross tonnage - GT	7386 t
IMO	9527764	Deadweight – DWT	9438 t
Marine Mobile Service Identity - MMSI	215691000	Length overall – LOA	128,19 m
Callsign	9HA2785	Beam	19,5 m
Type	Chemical/Oil Products Tanker	Draught	7,3 m
Flag	Malta		
Home port	Valetta		
Class society	Italian Naval Register		
Owner	Cappadocia Shipping Ltd		
Operated by	TEAM TANKERS INTERNATIONAL LTD		
Shipbuilding year	2011		
Builder	TVK SHIPYARD		

Substances involved in the accident

Xylene

Xylene is a colorless liquid that gives off a sweet smell, similar to benzene. It is flammable and harmful to humans and the environment. Xylene, still sometimes called dimethyl benzene exists in two forms:

- A mixture of isomers, composed of 3 xylene isomers: ortho-, meta- and for xylene. There is also a product of similar quality from which a large part of the ortho isomer has been removed, which is generally referred to as "low ortho content". Xylene isomers are also sold separately in the form of products of varying quality (investigational, pure, commercial, and technical).

- Mixed xylenes, composed of a mixture of 80-85% isomers and 15-20% ethylbenzene.

Xylene Risks

Fire: Xylenes and their vapors can cover a great distance, reach an ignition source and cause an explosion. In the heat of a fire, it can decompose giving off toxic and irritating fumes.

Explosion: Heating of a container storing xylene leads to an increase in pressurewith risk of bursting and the possibility of explosion of the type "explosive expansion of the vapor of a boiling liquid" (BLEVE). Xylene vapors can form explosive mixtures on contact with air at high temperature. Vapors are invisible and heavier than air. They spread at ground level and can enter sewage systems and the subsurface.

Toxicity: Inhalation of xylene vapors can cause headaches, drowsiness, injury, nausea, irritation of the nose and throat, as well as breathing difficulties. If the concentration is high, there is a danger of irritation of the mucous membranes, depression of the central nervous system and even death. Contact of xylene with the epidermis can cause irritation, dryness, erythema and dermatitis. Contact with the eyes can cause irritation and can lead to corneal injuries.

Behavior in the environment: When spilled into water, almost all of the xylene will evaporate. A small part will float, forming a spot that will extendto (density = 0.8) and vaporize. Xylene vapors are heavierthanair and move at ground level. A small part will dissolve and accumulate in aquatic organisms.

For more information on toxicology, ecotoxicology and first aid actions in case of accidents with Xylene you can consult the safety data sheet.

Protective equipment

It is necessary to ensure maximum protection of workers as xylenes produce flammable vapours at room temperature. It will be necessary to choose breathing apparatus and protective clothing. The necessary PPE is listed below:

- Fireproof protective suits.

- Hose masks, suitable in those static operations with a risk of localized contamination.

- Self-contained breathing apparatus (SCBA). This equipment allows to face accidents of any substance, since it allows the supply of uncontaminated air from an independent source to the environment. This equipment must be used by personnel who have been trained for it.

The use of SCBA masks is recommended under the following conditions:

- If the oxygen concentration is, or may become, less than 19%, or 21%, by volume.

- If the toxic concentration reaches or exceeds the threshold values (Annex I) or if it is unknown.

- In case of fire.

Vulnerabilities in the adjacent zone

Environmental vulnerability

The Camgal plan includes the environmental characterization of the Galician coast. For this characterization,the adapted environmental sensitivity index defined by NOAA was used. According tothis index, the area in which the tanker ran aground corresponds to a category1A, i.e. an exposed rocky area. There are no nearby areas of special protectionfrom the point of view of their environmental sensitivity.

Figure 1 Environmental sensitivity

Socio-economic vulnerability

The Camgal plan has a Risk Analysis that evaluates the socioeconomic sensitivity of the Galician coast. According to this analysis, the area in which the accident occurred presents a **high** vulnerability value. This vulnerability is determined by three factors:

- Population density, since the population living in the coastal zone is socially affected by an episode of this type.

The municipality of Ares has an area of 18.31 km2 and a population of 5829 inhabitants according to the 2020 census, which means a density of 309.01 inhabitants / km2, distributed in three areas of Ares, Camouco and Cervás. Its economy is based on fishing, in addition to tourism and agriculture.

Within a radius of 15 km around the area of the incident there are 13 municipalities, whose total population is 429,197 people distributed as follows:

CP	Population	Inhabitants
15004	Ares	5.829
15008	Bergondo	6.661
15009	Betanzos	13.053

15015	Cabanas	3.274
15030	- Iowa	247.604
15035	Phew	12.868
15036	Ferguson	65.560
15048	See also	6.277
15051	Mugados	5.215
15058	Potters	36.534
15064	Paderne	2.383
15069	Bridge	7.753
15075	Now	16.181
Total		**429.192**

- Tourism, as this is the engine of many of the Galician coastal areas. In this case, the percentage of companies in the municipality dedicated to the hospitality industry with respect to the total activities is taken into account. In the municipality of Ares, about 18% of its companies are dedicated to the hotel industry, making their vulnerability to this criterion moderate.

- Fishing, because the exploitation of fisheries, shellfish, and aquaculture resources, in addition to being one of the signs of identity of Galicia, is one of the pillars of its economy. The fishing sector includes the activities of "Fisheries and aquaculture- CNAE 03" and "Processing and conservation of fish, crustaceans and molluscs- CNAE 102". In the municipality of Ares, the contribution of these activities to the Gross Domestic Product of the municipality is between 2% and 10%, making their vulnerability according to this criterion of moderate level.

Near the area of the accident are the following fishery resources:

- Batting pool Sada A.

-Banks:

Bank code	Resource
411	Equinodermo
421	Ortiguilla de mar (Rest of discharges)
424	Ortiguilla de mar (Rest of discharges)
415	Touca (Algas), Argazo bravo (Algas), Argazo (Algas), Golfo (Algas), Carromeiro (Algas), Buche bravo (Algas), Algas NP (Algas), Red Algae (Algas), Green Algae (Algas), Coraliño (Algas), Fucus (Algas), Correa (Algas), Sea Noodle (Algas)
407	Perceives (Crustaceans)

Figure 2 Distribution of shellfish banks.

16. Annex 7

	Fact sheet 1: Collection of information	
	Opportunities for improvement	Possible actions to be carried out
1	CCS receives very generic information on the cargo carried by ships in transit. In case of an incident with ships in transit, it is essential to have detailed information on the cargo as soon as possible. The sending of information via VHF does not assist in this transmission of information. The fact that ships were obliged to transmit such information in a more detailed manner on cargo would facilitate management in the event of an incident.	Global: Prepare a file with the key information to be transmitted to the CCS in case of incident and the best channel to do so and propose its sending as a result from the DGECHO to the IMO. Galicia: Identification of key information listed so that the Galician CCS easily collect the most relevant information.
2	For anchored ships, only the information in the Single Scale Document (DUE) is known, but not the safety data sheet (SDS) of the products carried by the ship and which is usually known at an advanced stage of the emergency. It would be desirable to have more information about the cargo carried by ships approaching shore and anchored (in addition to the DUE)	Galicia: Identification of key information, ready so that the Captaincies and Port Authorities that authorize the anchorages easily collect the most relevant information. You can join the previous action.
	Information is transmitted through a VHF radio with precarious means of communication	Assess the state of the art in terms of communication technologies and if it is feasible to issue any recommendations in this regard.
3	The information on the product (physicochemical properties, behavior, toxicity, reactivity, etc.) is crucial to evaluate the risks and the most appropriate response and therefore, the support and advice of the chemical industry is essential. However, information on the behavior of substances when interacting with the sea and the coast is not available. Identification and easy access to key sources of information would improve decision-making.	Galicia: Prepare for the responders in Galicia a digital document with a compilation of the main sources of information on the behavior of substances in the marine environment and on the coast. MANIFESTS: Integrate this information into WP5 DSS tools.
4	One of the main aspects to improve is the coordination, communication, and agile transmission of information between the maritime and terrestrial subsystems and also between the different contingency plans involved. It is especially relevant at the local level, which for different reasons (lack of a local plan, shortage of personnel, there are no night patrols), can receive with significant delays the information of alerts for accidents	Promote more exercises specifically aimed at testing and strengthen coordination and communication flow between different plans with special emphasis on local plans. Global:

	at sea. It would be desirable to strengthen coordination and transmission of information both between subsystems and between different plans.	Include this type of exercises in the MANIFESTS tool aimed at formulating exercises. Galicia: Prepare a diagram/document identifying all plans/persons who should receive the available information on the substance (fact sheet and documentation) so that it can be consulted at the time of a crisis.
5	When assessing the possibility of a transfer of the cargo to land, information is not always available in an agile way on which entities/companies could perform this task and/or that have the appropriate equipment and preparation to carry out the transfer.	Galicia: Prepare a list of organizations / entities that have adequate personnel and equipment in Galicia or that can come from other areas (BRILAT, UME, Tarragona Firefighters, etc.) This action is in line with action 18 for sampling, and action 19: List of waste management companies. Global: Include the possibility of integrating this type of inventory in the DSS MANIFESTS
6	The management of a chemical emergency requires the consideration of many factors that condition the actions to be developed. It would be useful to have flowcharts that, depending on the different circumstances that can be considered, would support, and objectify decision-making.	Global: Generate decision-making trees based on existing information and manuals as a starting point. (e.g., See REMPEC Operational Manual with Flow Charts) Integrate these diagrams into the DSS MANIFESTS
	The importance of having quick information about the position of the spill and the time, as well as the quantities discharged to implement the models is highlighted.	It does not seem feasible to identify actions to act on it in cases where the spill occurs on ships in transit. Sometimes it is very difficult to determine the amount discharged and there is usually no reliable information on the start time of the discharge.

7	It emphasizes the importance of carrying out as soon as possible a zoning and observation of nearby areas/ precautionary zones, in a similar way to emergencies due to fire risk. The prediction of toxic cloud models provides information for this zone and associated toxicity levels.	Galicia: Study with Civil Protection and the Demarcation of Coasts how to transmit the relevant information for the establishment of zonings that could be integrated into the Camgal tools

	Fact sheet 2: Actions at sea	
	Opportunities for improvement	Possible actionsto be carried out
8	In the event of abandonment of the ship, ignoring a series of previous actions on board could complicate the management of the incident. Prior to leaving the ship, it would be helpful to convey to the crew or for the crew to be aware of a series of recommendations: leave lights on, leave the deck spray activated, take screenshots of the cargo control, etc.	Global: Preparation of a guide with recommendations prior to the abandonment of the ship. Perhaps it could be integrated into action 1
9	The response actions at sea depend on the information available and the decisions of the master of the ship and the owner, who is the one who must finally bear the costs of the operations by hiring specialized companies for this purpose. It seems advisable to keep the most relevant crew commanders on the emergency management council	Global: Add in the previous action the recommendation to integrate the ship's commanders into the POPRC of the Contingency Plans.
10	The response actions at sea, by decision of the shipowner, are carried out in many cases by specialized companies. The importance of the companies contracted by the shipowner to intervene in the different operations considers the vulnerability of the areas in which they operate is highlighted. The decisions of the actors of the maritime subsystem have an influence on the coastal subsystem, especially when it comes to vulnerable areas. Importance of strengthening sea-land interaction	Galicia: Provide the captaincies in Galicia with the vulnerability maps of their field of competence to transmit them together with the authorizations to the company hired by the shipowner. Include in the protocols the importance of crossing sea-land information regarding vulnerable areas, so that as far as possible the actions are the least harmful to the environment.
11	Importance of having reliable information and elements for decision making to determine if it is possible to approach the ship by air to perform the evacuation maneuver	Global: Check if there are protocols for approaching chemical accidents on land and try to adapt them in the form of decision trees. Raise it in the MANIFESTS consortium.
	Depending on the circumstances, it may be advisable to transfer the cargo, either to other tanks of the ship that have not been damaged or to another vessel or barge. Operations are complex and may require special means.	Assess the interest and feasibility of protocolizing the transfer by sea and identify necessary means for it. Raise it in the MANIFESTS consortium.

	Fact sheet 3: Actions on land	
	Opportunities for improvement	Possible actions to be carried out
12	In the management of the emergency on land it is essential to know the behavior of the substance on the coast, information that is not always obtained. Importance of transforming the information and transmission channel from the sea subsystem to the land subsystem	Galicia: See action 3 and incorporate decision-making bodies on the ground to send information
13	The Local Police do not usually receive information of pre-alerts originated by accidents on the coast, nor instructions regarding the establishment of restricted access areas in case of toxic cloud. The importance of developing and approving local plans and identifying available personnel in case of emergency is highlighted.	Galicia: Resume contact between the Camgal Plan and the coastal municipalities in which there is no approved local plan, to advance in the preparation and approval of all municipal action plans. With the intention of establishing action and communication protocols, identification of available human resources and allowing to identify and contact the responsible personnel in case of emergency at the municipal level.
14	Importance of having instructions at the municipal level to restrict the flight of drones around the accident and information regarding the establishment of exclusion zones. Establishment of an immediate danger zone, including navigation (sea and air) and possibly population (evacuation or shelter in place). Establishment of exclusion zones.	Galicia: The Oceanographic Modeling Unit (UMO) of Intecmar will review who can reliably establish exclusion zones. UDAC contacts DX Emergencias to find out how they address this issue.
15	In a chemical contamination event, assessment of the feasibility that would activate the EMU	Galicia: Obtain information on the specific mobilization protocol of the EMU, as well as explore the possible preparation of fire groups for their action on ships.
16	Importance of having information and tools that facilitate decision-making regarding a possible confinement or evacuation of the population.	Project: Adaptation to Galicia of the guide and decision tree oriented to this purpose prepared by the UK partners.

	Fact sheet 4: Monitoring.	
	Opportunities for improvement	Possible actions to be carried out
17	At present, there are no specific sensors to monitor the evolution of the cloud. It would be of great help to find these sensors and the ability to handle them.	SASEMAR currently has the iSAR Integral Innovation Program (call for public procurement of innovative technology) to modernize the rescue equipment and plans to develop a drone with the capacity to detect SNPP and toxic clouds to monitor the safe area. Galicia: Inquire about chemical companies in Galicia (SEVESO) or emergency teams that could have these sensors. MANIFESTS contemplates a specific action aimed at identifying and testing the sensors and issuing recommendations in this regard.
18	SASEMAR has a protocol for the sampling and identification of substances listed in Annex I and II of the MARPOL Convention. In the case of chemical discharges, they do not have the capacity to take samples since they do not have specific PPE. It would be important to establish sampling protocols for the main substances handled in ports and to know the specialized companies that could analyze them.	Galicia: Investigate possible collaboration with the UME for the collection and analysis of samples of this type. Collect information about who has this capability (include in action 5)

	Sheet 5: Post-incident	
	Opportunities for improvement	Possible actions to be carried out
19	It is necessary to plan the collection and treatment of waste, which companies could undertake it and what the budget would be. It would be helpful to bring together companies which have the capacity to manage this waste, to contact it and to reach agreements to respond in the event of an accident.	Galicia: Incorporation of this information to the databases maintained by the UDAC of the Camgal Plan, meeting with CMA to know the capabilities of Sogarisa and others. (Include information in Action 5)
	For the recovery of the areas, it is necessary to establish basic conditions based on environmental impact assessments. Therefore, the recovery of the affected areas will depend on their vulnerability and the actions that have been carried out in them.	Include in the vulnerability maps of the coast information on the most appropriate recovery actions depending on the characteristics of the coast.

Fact sheet 6: Contingency plans		
	Opportunities for improvement	Possible actions to be carried out
	Importance of strengthening local plans so that if necessary, they are activated and the necessary information for the response is available.	Support for the preparation and approval of all local municipal action plans that establish action and communication protocols, identification of available human resources and that allow identifying and contacting the responsible personnel in case of emergency at council level. Promote exercises with the participation of local plans.
	Importance of having decision-making trees when standardizing and homogenizing the response	Development of decision-making trees to standardize and homogenize the response