Activity 4 - MONALISA 2.0

New technology supporting safety in port and coastal areas
Challenges

Operational safety in ports and coastal areas

This activity has highlighted a wide variety of different aspects of operational safety in ports and coastal waters in order to minimise the number of marine accidents and to optimise the response if incidents do occur.

It has contributed to improved coordination of multidisciplinary teams in each field of response. In addition, the activity has defined specific and dedicated training topics.

This activity was divided into:

- Safety in ports
- Safety in coastal areas
- Risk management guidelines
- Risk assessment tools
- Safety information systems
- Training

Table of content

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>03 SAREX Valencia June 2015</td>
<td>09 Preparing for the worst</td>
</tr>
<tr>
<td>04 Safety in ports</td>
<td>09 Designing training for the future</td>
</tr>
<tr>
<td>05 Safety in coastal areas</td>
<td>10 Training saves lives</td>
</tr>
<tr>
<td>05 Life-rafts Recovery System</td>
<td>10 Leadership</td>
</tr>
<tr>
<td>05 Towing simulation tool</td>
<td>10 Keeping up with a changing world</td>
</tr>
<tr>
<td>05 Risk management guidelines</td>
<td>10 New fuel</td>
</tr>
<tr>
<td>06 Four tasks to manage risk</td>
<td></td>
</tr>
<tr>
<td>07 Technologies demonstrated during SAREX</td>
<td></td>
</tr>
</tbody>
</table>
700 people were involved in the 6-hour exercise of which around 400 were on board the vessel. The purpose of the exercise was to validate the new information exchange management and concepts as well as to evaluate the efficiency of the available systems and technologies.

Agencies involved in the SAREX
• the Spanish Vice-presidency
• the State Security Secretariat
• Maritime Services from the Civil Guard
• the Army Emergency Unit
• the Air Force
• the Navy Maritime Response Unit
• the General Sub-directorate of Operations from the Spanish Customs Administration
• the General Directorate for Merchant Marine,
• the Spanish Maritime Safety and Rescue Agency (SASEMAR)
• the State Secretariat for Civil Works
• the Spanish Red Cross
• the Valencia Port Authority
• the Healthcare and emergencies service from the Valencia Government
• the Valencia Government Delegation
• Acciona Trasmediterránea Shipping Company

“The exercise demonstrated the challenges that a mass rescue operation faces in general, as well as highlighting the specific set of challenges that are faced in a port. It was an opportunity for us to confirm our expectations, test new technology and to chisel out our processes for the future. It was particularly rewarding to see that teams from SASEMAR, the Civil Guard, crew members, Valencia port safety staff and civilian bodies collaborated in a proper way during the exercise, and that video of their actions were streamed for all to see in real time”, says Eugenia Sillero.
A rescue operation will face a specific set of challenges if the accident occurs when a vessel is arriving to or departing from a port. Having a detailed understanding of those specific challenges is vital to improving the response to a potential accident and to increase port safety.

Within the framework of this activity advanced information systems to support SAR, evacuation, first aid and ship recovery, and the use of decision support instruments like risk management guidelines and risk assessment tools have been investigated and tested. Contingency plans for mass evacuation in a port facility have been prepared based on:

- The definition of the potential risks and scenarios in a passenger terminal.
- The analysis of decisions and actions during a number of different table top exercises.
- The analysis of polls that were sent to other Port Authorities in Europe with topics including emergencies arising from accident to any personnel within port area, emergencies arising from accidental falling of vehicles into port waters and emergencies arising from geological hazards such as earthquakes.
- The SAREX exercise that was the final test bed for the tools, services and plans. After the Juan J. Sister ship was towed to the Trasmediterránea Terminal in Valencia, the port, health and civil protection plans were also tested.
Safety in Coastal areas

"Imagine a vessel with more than 5,000 people that is on fire or facing really bad weather conditions. The rescue operation must run smoothly or lives will be lost", says Eugenia.

**Life-rafts Recovery System**
The OLRS, On-board life-rafts Recovery System is a system for recovering life rafts and shipwrecked from the sea and to safely and quickly place them on-board the rescue ship. This is particularly advantageous in bad weather and rough sea conditions where hypothermia is a critical issue.

"OLRS eliminates a hazardous element by making it possible for the rescue vessel to lift the life raft without having to be very close to the raft. This is a much faster alternative than launching a rescue boat from the rescue ship", says Eugenia.

Testing of the system has been carried out at SASEMAR’s facilities at the Jovellanos Training Center in Gijon in northern Spain. The waves in the pool and the movement of the crane’s boom simulated operating conditions close to Sea State 4.

**Towing simulation tool**
SeaFEM is a suite of tools for computational analysis of the effect of waves, wind and currents on naval and offshore structures. During this activity new data was collected in order to improve the SeaFEM towing simulation tool.

"On site-data from real towing manoeuvring during the SAREX-exercise in Valencia was gathered and we have also collected data from various towing equipment and other associated elements", says Eugenia.

An outcome of considering the data from the towing of the SASEMAR’s "Punta Mayor" vessel was to include the effect of drift in towing simulations, which had not been considered so far. Data from the SASEMAR’s ‘Sr Mesana’ tug in Valencia during the SAR-exercise were collected. The ‘Juan J. Sister’ was also involved in the exercise but was towed by simulation in order to be able to compare the results from the simulator with the real scenario.

*The OLRS, On-board life-rafts Recovery System*
Risk management guidelines

In case of an accident, or other challenging situations at sea, it is very useful to have access to general protocols that are based on legislation and information from prior incidents that have taken place in similar conditions. The protocol should be a useful tool to follow the proper steps in case of a maritime accident.

Four tasks to manage risk
The first task carried out within this sub-activity was to create a database that contains all the accumulated knowledge. It allows you to filter and search and is a useful decision making tool. It provides the involved parties with access to vast amounts of historical data that they can use, rather than being limited to the individuals’ aggregated experience. The information can allow the rescue operation team to anticipate what will happen next and act smarter. There will be less guesswork and you can confidently and swiftly select the best action going forward. If, for example, a vessel is caught in a storm, the information in the tool will be able to provide case conclusions and advice you on if it will be better to move the vessel closer to land compared to other courses of action.

The second task consisted of a compilation of relevant legislation related to maritime accidents. This should serve as the basis for the protocols to follow both during and after a maritime accident.

The third task is a proposal of protocols based on the previous tasks carried out, taking advantage of the knowledge acquired through the analysis of the database and the legislation compiled, having its basis in the general regulation of IMO and European Directives. The fourth task is a proposal of protocols to follow after the maritime accident, which has its main basis in the general regulation of IMO and European Directives.

This database is alternative to searches or queries made to EMSA as it includes more search options. For access to the database, please contact Jose Luis Almazan, on behalf of the Technical University of Madrid, at jl@almazan.eu.

Public data is fed to the database and allows the user to select the fields that are considered important, set criteria and even make calculations. Looking at accidents that have occurred worldwide the database user can:

1. Create a query
2. Select the data table and the fields in it to consider
3. Establish search criteria
4. Execute the query
Technologies demonstrated during SAREX

SIGO
SIGO is an information system used for operations management of maritime emergencies. It includes information concerning the maritime traffic, the aerial and maritime units and the response operations. It also provides the data from the results of the response activities such as recovery of people.

SARMAP
SARMAP is a tool that creates, simulates and sends search patterns to the units when they are executing the task. Weather and sea conditions are simulated to provide the most suitable search path. During the exercise, this tool was integrated within the NAVSAR system to exchange information in real time with the SAR units.

SAFETRX
SAFETRX is a mobile app that makes it possible to include opportunity vessels to support mass evacuations when the local means are not sufficient. Leisure ships, and other non-SOLAS vessels, are not obliged to carry AIS-systems but with this app they can be detected and their assistance can be requested.

NAVSAR-12
NAVSAR-12 is a customized navigation, communication and information system available on a mini-ECDIS platform. It is suitable for response units with limited space and reduces their workload as information is fed automatically.

Emergency reporting web service
Emergency reporting web service is created to maintain updated information that is relevant to the victims’ relatives and other external agencies. Official reports are uploaded and other important links and information referred to the emergency is included – FAQ functions, telephones or contact details to the health- and civil agencies attending to the victims.

Gamified evacuation on the way
A gamified evacuation virtual guideline that allows cruise ship passengers to train emergency evacuation in advance has been implemented and tested prior to the exercise.

Integrated information viewer
Integrated information viewer is a tool that is accessed over the web that makes it possible to show the recommended response actions to the relevant actors in crisis management. Over a geographical information system it also provides the possibility to follow the movement of the units and the progress of the rescue operations.
Training
Preparing for the worst

No two accidents are identical, and most of the time emergencies arise completely unannounced. A high level of operational safety requires crew members, SAR officers, port safety teams and fire fighters to have the necessary knowledge and experience to make split second decisions, under pressure, and in situations that are new to them.

Information about past accidents, lessons learned during those emergencies and related IMO model courses are highly useful for training purposes. By preparing for those scenarios, and the wide variety of challenges that arise, the SAR officers and the port safety personnel are more likely to perform well in situations that are new to them.

Designing training for the future

Updates to the training activities are made in consultation with key industry actors and representatives from maritime authorities. It adheres to the STCW standards and the primary audience for the training is innovation developers, training providers, trainers and teachers, supply chain partners and key industry stakeholders.

Six main training topics were set as a priority:

1. Training on SAR and Mass Rescue Operations
2. Training on Safety and Mass Evacuation in Ports
3. Training on Emergency Management on board passenger ships
4. Training on Leadership and Human Factor in Crisis Scenarios
5. Training on IMO/ICAO/IAMSAR application
6. Training on Firefighting and LNG (Liquefied Natural Gas)

Adding skills for optimised rescue operations

Large vessels may nowadays house more than 5000 passengers and crew members. Limited space in the port may make it more difficult to evacuate a large number of people, and sometimes the number of people on the vessels exceeds the population on the host city. Providing them with first aid requires resources. It also requires a large number of people, representing several external actors, to collaborate effectively.

For a rescue operation to run optimally the people involved need to have the right skill set. Crew members and SAR services staff need to know what to do in order to react quickly in the face of an emergency, and to make good decisions that will save lives and minimise environmental impact. The fire fighters, who work in a city where a port is located, also need additional training in order to be able to do their job effectively if faced with a ship fire.

“As a part of the Operational Safety activity new elements have been integrated into the standard training sessions in order to make up for the shortcomings that have been identified”, says José Manuel Díaz Pérez.

José Manuel Díaz Pérez
Spanish Maritime Safety and Rescue Agency, SASEMAR.

Photo: Marina Díaz

*Fire fighters need knowledge and skills such as how to move inside the vessel and quickly reach any space, from the bridge to the engine room. Besides, they also need to be properly trained on how to embark safely, both from a helicopter or from a tug/fast action lifeboat*, says José.
Training saves lives
Crew members are all trained in the area of maritime safety. But the minimum level of training required does not prepare the crew members sufficiently for unknown critical situations. In order to be able to respond decisively, and to make a valuable contribution during a mass rescue, they need to update their training when new accident scenarios appear. Crew members that have a deeper knowledge of emergencies and rescue operations will also be able to cooperate more effectively with the other actors during the operation.

“If all of the parties that are involved in a rescue operation are on the same page they will collaborate better and their joint efforts are more likely to minimise human casualties and material and environmental damages. This is particularly true in the face of a large-scale crisis”, says José.

Leadership
Under the Manila amendments to the STCW code of IMO, it was agreed to include leadership as a new skill to be covered by the seafarers. This new topic has been included in MONALISA 2.0 project following the recommendations from IMO.

Keeping up with a changing world
New technology opens up a world of new possibilities in the field of operational safety. Today, among other things, advanced electronic information and communication systems are commonly used.

“Using new technological tools greatly improves safety, but in order for the new tools to be useful crew members need to know how to use them. They also have to be able to interpret the information properly and to act on it”, says José.

New fuel
Liquefied Natural Gas (LNG), with a temperature of around -162 centigrade degrees and 1/600th in volume in liquid state, was recently approved as a fuel for the maritime transport industry.

“Crews and fire fighters, who only have experience in fighting fires produced by conventional fuel or diesel oils, need to have their training updated to properly combat emergencies caused by LNG spills”, says José.
“Imagine a vessel with more than 5,000 people that is on fire or sailing under really bad weather conditions. The rescue operation must run smoothly and effectively or lives will be lost.”