



# VR-ME

Virtual Reality for Maritime Emergencies

# Intellectual Output 3: VR-ME VET course package

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## LU 1. 1 - Introductory Module

### PROJECT OVERVIEW

In December 2019, six vocational education and training provider experts as well as representatives of the European fishing industry started an Erasmus+ project called 'virtual reality for maritime emergencies', under the acronym 'VR\_ME'. For 33 months the project partners worked on developing a training programme and a virtual reality simulator for maritime emergencies on board a fishing vessel. emergencies such as fire, abandon ship, collision, man overboard, flooding, as well as manoeuvre failure do occur. such Emergencies are stressful situations where the crew must follow specific guidelines and procedures to assure their safety, Hence, this innovative project brings fishermen and women essential training in emergencies to a higher level with this ground-breaking tool in the fishing industry.



# VR-ME

*Logo of the Virtual Reality for Maritime Emergencies Project*

## CONTEXT

Emergencies in ships are stressful situations where crews must follow specific guidelines and procedures to assure their safety.

Most of fatal accidents in fishing sector were due to lack of knowledge on devices and / or emergency procedures, or non-completion of periodic training exercises and simulations. To assure a correct reaction by the crew in emergency situations, trainings and simulations are needed, where crewmen are exposed to a series of scenarios to demonstrate they know the procedures, and how to execute them.

VET entities in the marine sector don't have nowadays any kind of tool that can help crewmen to learn the procedures of how to react in these situations, apart from guidelines and handbooks, and trainings onboard are difficult to plan since vessels are operating most of their time, either at sea or charging procedures. Virtual Reality (VR) environments are becoming a more effective learning tool, where pupils can experience these emergency situations in immersive environments, moving around a 3D universe and interacting with people and objects.

## OBJECTIVES

VR-ME's ultimate goal was to develop a 3D immersive environment based on a trawler fishing boat, accessible through an Oculus Virtual Reality kit.

### **What exactly?**

A set of emergency situations based on the formal training requirements for fishing crew and the most common and dangerous cases. A VR-ME training course to tackle these emergency situations, in which the pupil can be tested to complete them in a 3D environment. This to learn how to react and what procedures must be followed. A training course in an open access format, accessible by downloading this software and using a 3D kit.

### **And for who?**

First and for all this course is meant for professionals of the fishing sector, vocational education and training providers and academies in the fishing sector and work safety, public and private entities working in labour safety, professional associations of fishermen, cooperatives of fishermen, and trainers or public and private centres of training in fishing activities.

## ACTIVITIES AND METHODOLOGY

To achieve the mentioned objectives, the project has undertaken the following activities under 3 main results;

**Result 1- Maritime emergencies and procedures:** Risk analysis and adaptability to simulator:

The project started with a study of the maritime emergencies in fishing vessels, the partners listed which emergencies should be selected according to several criteria, then the procedures to be followed were developed and finally these procedures were written in a language to be converted into a VR simulator. The main goal of this output was to prepare the data base and the background information for the simulator and the subsequent tutorials

**Result 2 - Maritime emergencies simulator development:**

This result consisted of the development of the simulator itself. This was a clear innovative approach, no exempt of a certain difficulty, because it represents real cases, interacting with other avatars, recreating scenarios of stress which require rapid action. The central axis of this Output was to develop a VR environment where the user moves inside a ship and has to face several emergency scenarios, these actions were based on the emergencies and procedures selected in the previous (ENGINE ROOM FIRE, ABANDONING VESSEL, MAN OVERBOARD).

**Result 3 Testing, translation and production of complementary materials:**

Result 3 has served to the following goals:

- Test the simulator with the targeted final beneficiaries and get their feedback
- Produce the handbook to manage the software properly
- Creation of VR-ME VET course package to complement the simulator, which includes:

The training program with the emergency cases studied and the procedure guidelines on which emergency case, an introductory module and the procedure explaining the possibilities of expanding the simulator. All contents are offered in English, Spanish, French, Dutch, and Greek.

## THE PROJECT PARTNERS

The consortium is formed by a set of entities combining VET providers and representatives of the fishing sector:

The partners consist of the applicant IMP, and SGS TECNOS, SQ LEARN, ARVI, Europêche, and PFA.

The partners are based in France, Spain, The Netherlands, Belgium, and Greece. This helps tackling the emergencies in the different EU Member States, compare and harmonize procedures as the reality of the fisheries sector varies among countries.

**IMP**, Institut Maritime de Prévention (FR) – The main training entity for labour safety in the French maritime sector;

**SGS TECNOS** (SP) – The world leader in certification and regulation and a renowned training company specially focused on work safety;

**SQ LEARN** (GR) – Expert developers of virtual reality tools for vocational education and training, known for their expertise, creative spirit and imaginative product design in e-learning;

**ARVI**, Cooperativa de Armadores de Pesca del Puerto de Vigo (SP) – A main vessel owner’s group in Spain and one of the most important ones in the European Union, and offering a training service as well as an occupational hazard prevention service;

**Europêche**, Association of National Organisation of Fishing Enterprises in the EU (BE) - The main representative of the fishing industry in Europe, and employer organisation of the European Commission’s Sectoral Social Dialogue Committee for Sea Fisheries dealing with professional training, social harmonisation and employment, health and safety at work and enlargement of the EU; and

**PFA**, Pelagic Freezer-trawler Association (NL) - Representing the interest of several European pelagic freezer-trawler companies with national, European, and global expertise when it comes to safety and health.

## EXPECTED RESULTS IMPACT AND LONGER- TERM BENEFITS

Among the main impacts that the project consortium expects to achieve:

- Prepare fishermen to better face emergency situations onboard
- Decrease of accidents and fatalities rate
- Got towards a harmonization of emergency onboard procedures
- Increase computer literacy of fishing professionals and the digitalization in the sector

## SOCIAL MEDIA ACTIONS

Project's own Website: <https://vr-me.eu/>

LinkedIn: <https://www.linkedin.com/company/64986249>

Twitter: [https://twitter.com/VRME\\_EU](https://twitter.com/VRME_EU)



## LU 1. 2 - Maritime emergencies in the European fishing sector

The following document gives an overview of the most common emergency cases that occurs in the fishing vessels between 2011 and 2019.

The purpose of this analysis is to summarise the most common emergencies in order to understand the subsequent selection of emergencies that have been included in the simulator in the following section.

This analysis is based on data uploaded to the European Marine Casualty Information Platform (EMCIP) by the investigation bodies of the EU Member States, and the European Maritime Safety Agency (EMSA) statistics based on this data presented in their 'Annual overview of marine casualties and incidents 2019' report. The latter report analyses data from 2011 to 05.08.2019, which for fishing vessels accounts to an average of **101 occurrences per year** (marine casualties and incidents).

It must be noted that the data only accounts for marine casualties and incidents involving fishing vessels to which Directive 2009/18/EC applies, which is vessels with a length of more than 15 metres. Fishing vessels of less than 15 metres fall within the scope only when they are involved in an occurrence together with a ship which is covered by the Directive.

### **The typology of the investigated accidents has been (occurrences with the ship):**

1. Loss of control: 16%
2. Flooding/foundering: 15%
3. Collision: 13%
4. Grounding/stranding: 10%
5. Fire/explosion: 7%
6. Capsizing/listing: 4%
7. Contact: 2%
8. Damage/loss equipment: 2%

### **The consequences of accidents for workers' health have been:**

1. People injured: 301
2. Lives lost: 170

### **Causes of accidents:**

The contributing factors, which are the occurrences with person(s), are grouped under so-called deviations<sup>1</sup>. In the chosen timeline for this analysis (01.01.2011-05.08.2019), 718 occurrences on board fishing vessels, the main blocks of causes have been:

1. Loss of control (total or partial) of machine: 13%
2. Slipping, stumbling and falling, fall of persons: 11%
3. Body movement without physical stress (generally leading to an external injury)<sup>2</sup>: 9%
4. Body movement under/ with physical stress (generally leading to an internal injury)<sup>3</sup>: 3%
5. Breakage, bursting, splitting, slipping, fall, collapse of material agent: 3%
6. Overflow, leak, flow, vaporisation, emission: 2%
7. Electrical problems, explosion, fire: 1% (5 cases)

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<sup>1</sup> A deviation consist in the description of the event deviating from normality leading to the accident.

<sup>2</sup> Like being caught or carried away, by something or by momentum; kneeling on, sitting on, leaning against; other group 60 type deviations not listed above; uncoordinated movements, spurious or untimely actions; walking on a sharp object.

<sup>3</sup> Like lifting, carrying, standing up; other; pushing/pulling; putting down, bending down; treading badly, twisting leg or ankle, slipping without falling; twisting/turning.

## **Analysis by type of accident:**

### **Capsizing**

There were 28 cases, mostly paired with trawlers. 15 of these 28 cases led to injuries/fatalities (54%). 22 people got injured, and 49 lives were lost.

### **Collision**

There were 96 cases, mostly it concerned trawlers. 22 out of the 96 cases led to injuries and/or fatalities (23%). 13 people got injured and 54 lives were lost.

### **Contact**

There were 17 cases of contact with an object, again mostly paired with trawlers. Only 3 out of the 17 cases led to injuries (18%). These 3 cases were all serious and led to a total of 5 people injured, but no fatalities.

### **Damage, loss of equipment**

There were 16 cases, mostly concerning trawlers. 8 of the 16 led to injuries/fatalities (50%). 5 people got injured and 5 lives were lost.

### **Fire, explosion**

There were 53 cases, mostly on board trawlers. 11 out of the 53 resulted in injuries/fatalities (21%). 14 people got injured and 9 lives were lost.

### **Flooding, foundering**

There were 105 cases, mostly concerning trawlers but also gillnetters, seiners and liners. 21 out of the 105 cases led to injuries/fatalities (20%). 20 people got injured and 57 lives were lost.

### **Grounding, stranding**

There were 69 cases, mostly trawlers and undefined fishing vessels, after that liners and multipurpose vessels. 6 out of the 69 cases led to injuries/fatalities (9%), all very serious. 7 people got injured and 13 people died.

### **Hull failure**

Just 3 cases, 2 liners and 2 gillnetter involved. 1 case led to 2 people injured.

### **Loss of control**

There were 111 cases, mostly trawlers, after that unspecified fishing vessels and multipurpose vessels. 4 cases led to injuries/fatalities (4%). 5 people got injured and 1 person died.

### **Missing**

1 case with a dredger, 2 lives were lost.

### **Body movement under or with physical stress**

There were 23 cases, all of which the type of fishing vessel is not defined. 21 out of the 23 led to injuries/fatalities (91%). 18 people got injured and 3 lives were lost.

### **Body movement without physical stress**

There were 63 cases, mostly trawlers and unspecified fishing vessel types. 61 out of the 63 cases led to injuries/fatalities (97%). 53 people got injured and 9 lives were lost.

### **Breakage, bursting, spitting, slipping, fall, collapse of material agent**

There were 23 cases, mostly trawlers and unspecified fishing vessel types. 21 out of the 23 cases led to injuries/fatalities (91%). 18 people got injured and 3 lives were lost.

### **Deviation by overflow, overturn, leak, flow, vaporisation, emission**

There were 11 cases, all of which the type of fishing vessel is not defined. 10 out of the 11 cases led to injuries/fatalities (91%). 11 people got injured and 5 lives were lost.

### **Deviation due to electrical problems, explosion, fire**

There were 6 cases, all of which the type of fishing vessel is not defined. 5 out of the 6 cases led to injuries/fatalities (83%). 4 people got injured and 1 live was lost.

### **Loss of control (total or partial) of machine, means of transport or handling equipment, handheld tool, object, animal**

There were 95 cases, mostly unspecified fishing vessel types but apart from that a lot of trawler cases. 89 out of the 95 cases led to injuries/fatalities (94%). 81 people got injured and 9 lives were lost.

### **Slipping, stumbling and falling, fall of persons**

There were 82 cases, mostly on-board trawlers and unspecified fishing vessel types. 76 out of the 82 cases led to injuries/fatalities (93%). 48 people got injured and 28 lives were lost.

**Analysis of accidents investigated according to type of fishery:**

Type of fishery	Sinister
Dredger	3.2
Gillnetter	6.4
Liner	5.4
Multipurpose	6.4
Seiner	5
Potter	1
Trawler	43.6
Other	3.3

**Dredger**

There were 23 cases with dredgers of which 6 entailed injuries/fatalities (26%). In total, 5 people were injured and 6 lives were lost. In 2 cases this was due to loss of control (2 injured); in 1 case it was body movement without physical stress (1 injured); in 1 case it was slipping (1 fatality); 1 case of collision with another ship and flooding (3 lives lost); and 1 capsizing case (2 lives lost).

The remaining cases without impact on the crew had mostly to do with flooding, collision, fire, and contact with a floating object.

Of the 23 cases, 18 can be attributed to occurrence with the ship and 5 to deviation. When it comes to injuries and fatalities most cases were due to deviation (4 compared to 2 for occurrence with the ship). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: The investigating states are all European: UK, Germany, and France.

## **Gillnetter**

There were 46 cases with gillnetters of which 14 entailed injuries/fatalities (30%). In total, 10 people were injured, and 13 lives were lost. Most people injured and lost during 1 fire explosion case (9 in total). The rest of the cases: 6 dues to slipping, stumbling and falling; 1 due to breakage; 1 due to fire explosion; 2 due to loss of control; 2 cases of flooding; and 1 case without information on the cause.

The remaining occurrences happened mostly due to loss of control (usually propulsion power) and due to flooding.

Of the 46 cases, 33 can be attributed to occurrence with the ship and 13 to deviation. When it comes to injuries and fatalities most cases were due to deviation (10 compared to 4 for occurrence with the ship). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: Most lives lost apart from this 1 fire explosion case were due to slipping, stumbling and falling. A lot of occurrences happened because of loss of propulsion power and flooding.

## **Liner**

There were 39 cases with liners of which 14 entailed injuries/fatalities (36%). In total, 14 people were injured and 7 lives were lost. Most people lost due to collision with another ship (5 in total) and injured due to loss of control, a fire explosion, or body movement without any physical stress.

The remaining occurrences happened mostly due to loss of control (propulsion power), grounding, or flooding.

Of the 39 cases, 28 can be attributed to occurrence with the ship and 11 to deviation. When it comes to injuries and fatalities most cases were due to deviation (9 compared to 5 for occurrence with the ship). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: Investigating state mostly Iceland or Spain and a lot of cases due to grounding/stranding because of power loss.

## **Multipurpose**

There were 46 cases with multipurpose vessels (seiner-handliner, trawler-purse seiner, other) of which 8 entailed injuries/fatalities (17%). In total, 7 people were injured and 1 live was lost (due to deviation by means of loss of control). The people injured was mostly due to slipping, stumbling, and falling.

The remaining occurrences happened mostly due to loss of control (loss of propulsion or electrical power), grounding, or collision with another ship.

Of the 46 cases, 37 can be attributed to occurrence with the ship and 9 to deviation. When it comes to injuries and fatalities all cases were due to deviation.

What stands out: Investigating state mostly Iceland and all cases where people got injured or died were because of deviation. Also relatively low percentage of cases with injuries/fatalities compared to the total amount of cases for multipurpose fishing vessels.

### **Seiner**

There were 36 cases with seiners of which 15 entailed injuries/fatalities (42%). In total, 7 people were injured and 9 lives were lost. There was no specific reason why fatalities occurred (6 different cases), and the same accounts for the injuries (6 different cases).

The remaining occurrences happened mostly due to loss of control (usually propulsion power), apart from that due to flooding, collision, fire, and grounding.

Of the 36 cases, 26 can be attributed to occurrence with the ship and 11 to deviation (1 case had both). When it comes to injuries and fatalities most cases were due to deviation (10 compared to 6 for occurrence with the ship). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: Investigating state is mostly Spain, although also France and Iceland stand out. A high percentage of injuries/fatalities compared to the total cases with seiners. Compared to other vessel types, a higher number of fatalities than injuries. Also a wide spread of causes concerning cases that led to injuries and/or fatalities.

### **Potter**

There were 7 cases with potters of which 4 entailed injuries/fatalities (57%). In total, 4 people were injured and 1 live was lost (due to slipping). The people injured was because of body movement without any physical stress, or flooding.

The remaining occurrences happened due to flooding and slipping.

Of the 7 cases, 3 can be attributed to occurrence with the ship and 4 to deviation. When it comes to injuries and fatalities most cases were due to deviation (3 compared to 1 for occurrence with the ship). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: Not much considering the low number of cases for potters. However, of the cases with potters a high percentage entails injuries and/or fatalities.

## **Trawler**

There were 313 cases with seiners of which 153 entailed injuries/fatalities (49%). In total, 130 people were injured, and 110 lives were lost. The fatalities were mostly due to flooding and after that collision, capsizing or slipping. The injuries were due to loss of control over machines mostly, after that due to body movement without any physical stress, slipping, or capsizing.

The remaining occurrences happened mostly due to loss of control (usually propulsion power or electrical power loss), apart from that also collision, flooding, grounding and fire/explosion were the main causes.

Of the 313 cases, 190 can be attributed to occurrence with the ship and 124 to deviation (1 case had both). When it comes to injuries and fatalities most cases were due to deviation (115 compared to 39 for occurrence with the ship (1 case had both)). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: Both high amount of injuries and fatalities. Taken over all the different fishing vessel types, most fatalities occurred on board trawlers (63.4%), and mostly on stern trawlers (half of the 63.4%). Concerning injuries, loss of control over machines (deviation) is one main cause for injuries. Out of the total injuries on board of all fishing vessel types, most took place on board trawlers (59.1%). Also, among all fishing vessels, just over half of the very serious casualties involved trawlers. Besides, most fishing vessels lost are trawlers, in particular stern trawlers.

## **Other**

There were 24 cases with non-specified type of fishing vessel of which 8 entailed injuries/fatalities (33%). In total 5 people were injured, and 10 lives were lost. Most lives were lost during a capsize case and a flooding case (combined 7 fatalities). No specific cause that led to injuries.

The remaining occurrences happened mostly due to collisions with another ship or flooding.

Of the 24 cases, 18 can be attributed to occurrence with the ship and 6 to deviation. When it comes to injuries and fatalities most cases were due to deviation (6 compared to 2 for occurrence with the ship). Although the highest number of injuries and/or fatalities in one case happened due to occurrence with the ship.

What stands out: A higher rate of fatalities than injuries.



**Description of the most frequent accidents investigated:**

Ship size Length	Average length overall of 29.5m. Most fishing vessels fell within 15 -25m segment corresponding to 55.4% of the total <sup>4</sup> .
Type of fisheries	Trawling (mostly trawler stern)
Operating time	Not specified, but the youngest ship category is liner (23.1y) while the oldest is dredgers (31.2y).
Maritime zone	For trawlers and liners in open sea. For other fishing vessels, in territorial sea
Voyage segment	During mid-water phase (almost 50%), when fishing operations take place
Type of accident	<p>Occurrences with the ship: Loss of control with 37.7% (in particular loss of propulsion power with 29.7% of the 37.7%) and collision with 27%.</p> <p>Deviation: falls, loss of control of machine, and body movement without stress on board (in total representing 72.6% of the causes for all events, on board trawlers this is 59.4%).</p> <p>Most accidents can be attributed to a human action (62.4%) and to system/equipment failure (23.2%)</p>
Origin	Ship deck (68.5%)
Consequences	Serious and fatal
Contributing factors	<p>Human action (shipboard operation due to (lack of) safety awareness (58.9%))</p> <p>The most reported contributing factors related to human action under ship board operations: social environment, safety awareness; personnel and manning, inadequate work methods; personnel and manning, lack of knowledge</p>
Time of the event	From 1 January 2011 to 5 August 2019

<sup>4</sup> Note that for the value under the 20m category, the number of ships with the length overall from >15m to 20m is meant.

### **Emergency Management Analysis:**

**Most casualties on EU fishing vessels happened due to human action, specifically during shipboard operation when a lack of safety awareness occurred. In addition, inadequate work methods and a lack of knowledge among personnel and manning greatly contributed to the casualties on board fishing vessels.**

The following causality events stand out:

- Loss of control (usually over propulsion power);
- Flooding;
- Collision;

The following contributing factors stand out:

- Loss of control of machine on board;
- Slipping, stumbling, falling; and
- Body movement without stress (generally leading to an external injury)

The types of events which mostly led to injuries/fatalities:

- Capsizing;
- Damage/loss equipment;
- Body under/with stress;
- Body movement without stress;
- Breakage;
- Overflow;
- Electrical problems, explosion, fire;
- Loss of control of machine;
- Slipping, stumbling and falling

The types of events where most injuries/fatalities occurred:

- Capsizing;
- Collision;
- Flooding;
- Body movement without stress;
- Loss of control of machine;
- Slipping, stumbling and falling

## LU 1. 3 - Emergencies developed in the simulator

### 1.3.1.- IDENTIFICATION, EVALUATION AND PLANNING OF RISKS

#### OBJECTIVES

The Law Prevention of Risks “has as its main objective to promote security and health of workers using measures and developing the necessary activities for prevention of working hazards”.

The Prevention of Risks should be integrated at all levels of the corporate management. A very important instrument to accomplish this objective is the evaluation of Risks.

The evaluation of Risks is the process used to estimate the dimension of those risks that have not been able to avert, obtaining the necessary information for the entrepreneur to make decisions in preventive measures.

When from the evaluation we decide that necessary preventive measures have to be taken, it should be clear the situations in which:

- a) To eliminate or reduce risk through preventive measures at the source, organisational, collective protection, individual protection, or training and giving information to workers.
- b) Control periodically conditions, organization and methods of work and health status.

In determining these preventive measures should be taking in mind the following general principles:

- 1) Avoid Risks
- 2) Evaluate the risks that cannot be avoided.
- 3) Eliminate the risk or, if total elimination is not possible, reduce the risk at the source, f.e. by isolating the risk where appropriate
- 4) Reduce exposure by isolating the worker if previous measure are not successful enough.
- 5) Provide PPE's after elimination of reduction of the risk and measure are not sufficient enough.
- 6) Adapt work to the worker.
- 7) Take into account the state of art.
- 8) Replace the dangerous by the involving little or no danger.
- 9) Plan prevention integrating technique, organization, working conditions, labour relations and influence of environmental factors.

- 10) Give preference to collective protection instead of individual protection.
- 11) Give the correct instructions to workers.
- 12) Take into consideration the professional knowledge and proficiency in matters of safety and health before designating tasks.
- 13) Ensuring sufficient and adequate information.
- 14) Foresee distractions or not reckless negligence.

### 1.3.2.- METHODOLOGY

#### 1.3.2.1.- INTRODUCTION

The methodology of risks evaluation is based on identification and quantification, that evaluates **RISK SITUATIONS** that are related, taking into account the two possible origins of such a risk:

- The risk associated with the **AREAS**, to have in mind places, environment and physical space where the operations take place in each Workplace.
- The risk situations corresponding with **OPERATIONS**, taking in mind the tasks and activities that are carried out by each Workplace.

Therefore, the systematic methodology that is followed in the risk evaluation is as follows:

- ✓ All working posts will be taken in consideration.
- ✓ All areas of the company will be identified, seeking to occupy the entire surface. We will try that the areas chosen, form units of organization and activity as homogeneous as possible.
- ✓ Identify the various **OPERATIONS** carried out in the company. Each of them may involve different tasks or activities, as long as they are assigned to the same job.
- ✓ **EVALUATION** (determine, identify and quantify) all **RISK SITUATIONS** associated to each **AREA** and each **OPERATION**.
- ✓ All **AREAS** and **OPERATIONS** will be **ASSOCIATED** with their risk situation, to each workplace of the company, in order to obtain the risk evaluation of each of them, assigning the risks concerning the activities or tasks and areas where they are carried out.

A **RISK SITUATION** consists of the following aspects:

- Identify of **MATERIAL AGENTS** and **WORKING CONDITIONS** which establish the origin of the risk.
- The exhaustive and detailed description of the **RISK CAUSE**, in other words, the identification of the exact situation detected during the evaluation.
- Definition of identified **RISK**.
- The identification of **CONTROL MEASURES** implemented in the facility.
- The definition and proposed **CORRECTIVE MEASURES** and / or **PREVENTIVE ACTIONS** deemed necessary.
- **QUANTIFICATION** of each risk situation.
- Risk **ESTIMATION**.

In subsequent sections are described in greater detail these aspects mentioned herein.

Summarizing the main features of the method to implement will include the following requirements:

- a) **Identify all existing risks.** The first step of the evaluation will come to define for each worker of the company risk situations and dangers that may be exposed
- b) **Quantify identified risks.** There shall be established a value of probability of occurrence of the risk and severity of the effects that might occur.

#### 1.3.2.2.- RISK IDENTIFICATION

With the objective to systematize the study and permit the comparison of results of identification between different activities or with other studies, it is used the classification of hazard situations applied in the analytic of accidents/incidents with its corresponding codification.

Taking as model the method of Evaluation *of Risks* developed by **Nacional Institute of Labour Security and Hygiene (INSHT)**.

<i>RISKS</i>
<ol style="list-style-type: none"><li>1. Man overboard</li><li>2. Fire</li><li>3. Sinking / Overturning</li><li>4. Collision/ Boarding</li><li>5. Stranded /Grounding</li><li>6. Failure in machines</li><li>7. Flood / Taking water</li><li>8. Others</li></ol>

### 1.3.2.3.- QUANTIFY IDENTIFIED RISKS

Once the risk is identified and analysed, it is valued using the concept of **Risk Estimation**, which is obtained using the evaluation of the probability that the harm occurs and the consequences of that harm:

- **Harm consequences:** to determine the consequence of the harm we have to consider the part of the body damaged and the nature of the hazard, living a rank of **slightly harmful, harmful or extremely harmful**.

<i>Severity Valoration</i>	
<i>Consequences</i>	<i>Description</i>
<i>Slightly harmful (SH)</i>	Superficial damages: cuts and small bruises, eye irritation caused by dust.  Slight pain or irritation, for example: headache, discomfort.
<i>Harmful (H)</i>	Injuries, burns, commotions, important sprains, minor fractures.  Dermatitis, deafness, asthma, musco-esqueletic disorder, illness which provokes a minor incapacity.
<i>Extremely Harmfull (EH)</i>	Amputations, mayor fractures, intoxications, multiple damages, fatal damages.  Cancer o and other chronic illness which shortens live.

- **Probability** that the harm occurs, it can be graduated from low to high, with the following criterium:

<i>Probability valoration</i>	
<i>Probability</i>	<i>Description</i>
<b>Low ( L )</b>	The damage rarely occurs
<b>Medium ( M )</b>	The damage will occur in some occasions
<b>High ( H )</b>	The damage will occur always or almost always

At the time to establish the harm probability, it has to be taken in consideration if the control measures already in progress are correct. Legal requirements and good code practices for control of specific measures, also play an important part.

The following chart shows a simple method to estimate the risk level according with the probability and the consequences of the harm:

<i>RISK ESTIMATION</i>				
		<i>CONSEQUENCES.</i>		
		Slightly Harmful	Harmful	Extremely Harmful
<i>PROBABILITY.</i>	Low	Trivial (T)	Tolerable (TO)	MODERATE (M)
	Medium	Tolerable (TO)	MODERATE (M)	Important (I)
	High	MODERATE (M)	Important (I)	Intolerable (IN)



The risk estimations showed in the chart above are the basis to decide if improvement is needed in the existing controls or if new ones are required. It is also used to schedule actions in time.

In the following chart it is shown the meaning of every risk level, the efforts needed for their control and the urgency in which the control measures should be taken.

<i>RISK</i>	<i>ACTION AND TIMING</i>
<b>Trivial</b>	No need of specific action
<b>Tolerable</b>	No need to improve the preventive action. Nevertheless, more worthwhile solutions should be considered or improvements of little economic effort. Periodic verification is required to assure the effectiveness of the control measures.
<b>Moderate</b>	Efforts should be made to reduce risks, deciding the investments needed. The measures to minimize risk should be specified in a time schedule. When the moderate risk is associated with extreme harmful consequences, a further action will be needed, more precise, the probability of harm as a base to improve the control measures.
<b>Important</b>	Until the risk is reduced, work shall not start. Considerable resources may be handed in order to control the risk. When the risk corresponds to a work taking place, the problem should be fixed in less time than used to correct moderate risks.
<b>Intolerable</b>	Until the risk is reduced work shall not start or continue. If the risk is not possible to be reduced, even with unlimited resources, work should be prohibited.

#### 1.3.2.4.- PREVENTIVE ACTIVITY PLANNIFICATION: CORRECTIVE MEASURES

Once made the initial risk evaluation, we elaborate the Planification of Prevention Activities for Risks which takes in hand the different correction actions with the objective to eliminate, control and reduce the risks detected.

Such planning is based on the risks identified in the review of the initial evaluation and the number of workers exposed to them.

The main objectives of the planning preventive activities are:

- Prioritize the measures proposed to eliminate, control and / or mitigate the risks identified in the Risk Evaluation, **for it establishes priorities in terms of risk to consider, on a scale of I to V, giving greater priority to Level I and lower successive II, III, IV, V.**
- Establish a time limit for completion of the proposed actions.
- Establish a responsible for complying with the proposed actions.
- Comply with the preventive principles.

Each of the deficiencies or conformities; detected should be studied to see if it is possible to implement corrective measures and / or preventive actions to eliminate the risk, looking to eliminate or at least minimize its consequences and probability of occurrence.

# Part I

## Filling Card n° 1

### RISK IDENTIFICATION

## FILLING CARD N° 1: RISK IDENTIFICATION

<b>SHIPOWNER:</b>	ARVI			<b>TYPE OF EVALUATION</b>	X	<b>INITIAL</b>
<b>VESSEL:</b>	FISHING TRAWLER	<i>DATE</i>	17/04/2020			<b>CHECKUP DUE TO ACCIDENT</b>

		RISKS							
Nº	SECTION	1	2	3	4	5	6	7	8
01	VESSEL	X	X	X	X	X	X	X	

### WAY OF ACCIDENT CODE

1. Man overboard
2. Fire
3. Sinking / Overturning
4. Collision/ Boarding
5. Stranded /Grounding
6. Failure in machines
7. Flood / Taking water
8. Others

### RISK ESTIMATION

- TRIVIAL
- TOLERABLE
- MODERATE
- IMPORTANT
- INTOLERABLE

# Filling Card nº 2

**RISK EVALUATION**

**FILLING CARD Nº 2: RISK EVALUATION**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

Nº	IDENTIFIED RISK	ANOMALY CONDITION, ORIGIN OR CAUSE OF RISK	Probability	Consequences	Estimation
1	<b>Man overboard</b>	During upper deck fishing operations, absence of collective or individual protections, accesses or stays in places with risks of falling into the water	<b>L</b>	<b>EH</b>	<b>MODERATE</b>
2	<b>Fire</b>	Poor maintenance of electrical installation, engine, bilge, storage of chemicals, lack of signalling and cleaning work with flammable substances or fuel, poor maintenance of detection systems and fire alarms	<b>L</b>	<b>EH</b>	<b>MODERATE</b>
3	<b>Sinking / Overturning</b>	Lost of stability, water entrance, weather conditions.	<b>L</b>	<b>EH</b>	<b>MODERATE</b>
4	<b>Collision/ Boarding</b>	Against the coast, pier, another vessel or semi-submersible object adrift, poor maintenance of radar	<b>L</b>	<b>EH</b>	<b>MODERATE</b>

**FILLING CARD Nº 2: RISK EVALUATION**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

Nº	IDENTIFIED RISK	ANOMALY CONDITION, ORIGIN OR CAUSE OF RISK	Probability	Consequences	Estimation
5	<b>Stranded /Grounding</b>	Against low and / or depth for excessive proximity to the coast or shore , poor maintenance of the sounding line	L	H	TOLERABLE
6	<b>Failure in machines/ engine failure</b>	Lack of regular maintenance, lack of material respect,	L	H	TOLERABLE
7	<b>Flood / Taking water</b>	Lack of maintenance and signage of sealing elements, closures deck, bale out of bilge	L	EH	MODERATE

# Part II

## Filling Card n° 3

**INTEGRATED PREVENTIVE PLANNING**



**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020	OF EVALUATION		CHECKUP DUE TO ACCIDENT

Nº of Risk	ACTION PROPOSED	Responsable	Beginning Date	Final Date	P
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**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

1	To work in heights or with risk of falling into the sea, safety harnesses should be used.	Shipowner / Crew	17/04/2020	continuous	III
1	To work on deck or move about, lifejacket should be used, recommended self-inflating. It should be marked the use with a signal	Shipowner / Crew	17/04/2020	continuous	III
1	Avoid positioning on the rails and / or places where it is easy to fall to water, especially with bad weather.	Shipowner / Crew	17/04/2020	continuous	III
1	It is prohibited to move on top of the fishing gear, unless strictly necessary and taking precautions when it is collected.	Shipowner / Crew	17/04/2020	continuous	III
1	Any place the crew can access , must not be slippery and should be provided with anti-fall equipment	Shipowner / Crew	17/04/2020	continuous	III
1	The stern gate should be opened only for throwing and pulling of the fishing net	Shipowner / Crew	17/04/2020	continuous	III
1	The gateways on the sides must be free of gear and equipment, if occupation of that area is necessary, it will be closed to passing, informing the crew and signaling the area and use of safety harnessés	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

1	It has to be verified that the lifebuoys are stowed in a way that are easily thrown into the sea, at least half the lifebuoys must be equipped with a self-activated light that flashes constantly for at least two hours, and, at least two of the lifebuoys will have a smoke signal with a highly visible colour and lasting at least 15 minutes.	Shipowner / Crew	17/04/2020	continuous	III
1	Do not run on upper deck unless strictly necessary	Shipowner/ Crew	17/04/2020	continuous	III
1	Working lifejackets should have a localization device	Shipowner/ Crew	17/04/2020	continuous	III
2	The pipes and valves of flammable gases will be object of maintenance and periodic reviews	Shipowner / Crew	17/04/2020	continuous	III
2	Periodic checkup of the gas bottle valves	Shipowner / Crew	17/04/2020	continuous	III
2	Development a working procedures for conducting operations in potentially explosive atmospheres developing safety instructions to work on welding, oxycutting, painting	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

2	Periodic checkup of gas exits in all tanks	Shipowner / Crew	17/04/2020	continuous	III
2	The storage of paints and other chemicals will take place in closets designed exclusively for this purpose	Shipowner / Crew	17/04/2020	continuous	III
2	It will be checked the atmosphere before accessing all confined space, as well as after the conclusion of all work generator of explosive atmospheres	Shipowner / Crew	25/04/2020	continuous	III
2	The storage area of chemicals and bottles of flammable gases must have adequate ventilation to prevent condensation. This storage of flammable products should be in ventilated and / or on open decks. It is recommended the physical separation of comburent and combustible bottles.	Shipowner / Crew	17/04/2020	continuous	III
2	Never use oxygen to ventilate an area or zone or for clean-up operations	Shipowner / Crew	17/04/2020	continuous	III
2	Do not mix chemicals if the physical and chemical properties are not known with certainty, knowing in advance the possibilities of mixing that occurs without a risk	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

2	Any work with high temperatures will not be carried out with the presence of fuel and / or flammable gases without taking appropriate security measures	Shipowner / Crew	17/04/2020	continuous	III
2	Maintaining optimal conditions in facilities and pressure equipment, Programming revisions	Shipowner / Crew	17/04/2020	continuous	III
2	The accommodations, closed workplaces , engine room and holds must be equipped with fire extinguishing devices	Shipowner / Crew	17/04/2020	continuous	III
2	The anti fire devices should always be in place, kept in perfect state of maintenance and be ready for immediate use, unhindered	Shipowner / Crew	17/04/2020	continuous	III
2	Before departure to sea all fire fighting equipment shall be checked	Shipowner / Crew	17/04/2020	continuous	III
2	All devices to combat Fires must be marked	Shipowner / Crew	17/04/2020	continuous	III
2	The detection and alarm systems should be tested regularly and maintained in good condition, checking operating correctly indicating the presence of a fire and the point where it has occurred; will verify	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

	that all services against fires, pumps, hoses,, valves, fire extinguishers and firefighter equipment work correctly				
2	Fire drills or exercises will be conducted regularly	Shipowner / Crew	17/04/2020	continuous	III
2	The storage of flammable materials or products will be held in protected closets	Shipowner / Crew	17/04/2020	continuous	III
2	Possible sources of ignition must be identified at all times	Shipowner / Crew	17/04/2020	continuous	III
2	It will prohibited smoking in areas where fuels and flammable products are stored as well as in cabins, signalling the prohibition in the area	Shipowner / Crew	17/04/2020	continuous	III
2	Check periodically the proper functioning of the emergency lighting	Shipowner / Crew	17/04/2020	continuous	III
2	The routes and emergency exits should be clear, well lit and marked	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

2	The storage of flammable gases will be made in ventilated spaces, recommend physical separation of fuel and oxidizing bottles	Shipowner / Crew	17/04/2020	continuous	III
2	Do not use compressed air for self cleaning or to clean parts or products containing fuels	Shipowner / Crew	17/04/2020	continuous	III
2	Any oil or fuel leak must be repaired and cleaned as soon as possible	Shipowner / Crew	17/04/2020	continuous	III
2	Carpets of accommodation will be exempt of grease and should be fireproof	Shipowner / Crew	17/04/2020	continuous	III
2	The electrical installation should be subject to periodic maintenance	Shipowner / Crew	17/04/2020	continuous	III
2	Do not store flammable products in the engine room, servo or near electrical boxes	Shipowner / Crew	17/04/2020	continuous	III
2	Maintain bilges clean and drained	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

2	Develop safety instructions for high temperature works as welding or oxycutting	Shipowner / Crew	17/04/2020	continuous	III
2	Before starting any high temperature work oversee the work area, thereby eliminating any flammable substance and checking if necessary, the absence of flammable gases	Shipowner / Crew	17/04/2020	continuous	III
2	Regular inspections should be carried out in fire fighting equipment, emergency, abandonment and survival	Shipowner / Crew	17/04/2020	continuous	III
2	Have metal containers with lids, for the deposit of rags containing flammable substances such as oils, fuels	Shipowner / Crew	17/04/2020	continuous	III
2	Revision and optimal maintenance of circuits of fuel and oil. Inspection and leak control	Shipowner / Crew	17/04/2020	continuous	III
2	Muster chart should be displayed in a place common to all crew as well as the fire fighting and safety plan	Shipowner / Crew	17/04/2020	continuous	III
2	The beds in cabins must be numbered, placing the muster chart number which corresponds	Shipowner / Crew	17/04/2020	continuous	III



**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

2	There will be a safety procedure for bunkering	Shipowner / Crew	17/04/2020	continuous	III
2	The welding and oxycutting equipment will have periodic preventive maintenance	Shipowner / Crew	17/04/2020	continuous	III
2	The kitchen hood and stove will be cleaned regularly	Shipowner / Crew	17/04/2020	continuous	III
3	The stability of the vessel will remain intact under the provided service conditions.	Shipowner / Crew	17/04/2020	continuous	III
3	The vessel must have recorded and available to staff on duty information on the characteristics of stability	Shipowner / Crew	17/04/2020	continuous	III
3	The instructions on stability must be strictly observed	Shipowner / Crew	17/04/2020	continuous	III
3	Regularly review the state of the hull	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

3	Taking the necessary precautions with regard to fishing methods that can influence the stability of of the vessel	Shipowner / Crew	17/04/2020	continuous	III
3	Maintain the Stability Report ready for consultation	Shipowner / Crew	17/04/2020	continuous	III
3	While sailing have always turned on the VHF and navigation equipment	Shipowner / Crew	17/04/2020	continuous	III
3	Prevent the accumulation of water on deck	Shipowner / Crew	17/04/2020	continuous	III
3	Allways have on board, verifying their status regularly and always before each exit to the sea, life jackets, lifebuoys, smoke signals, life rafts,launching survival craft	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

3	<p>We need to check regularly the status of lifeboats and the crew must be informed about the operations of lifting and lowering of the boat; the equipment will be checked on board lifeboats,.</p> <p>The rescue boat can be any of the lifeboats and the rescue crew must be formed by at least two people equipped with immersion suits and life jackets, the boat to serve as a rescue boat must have additional equipment that should also be checked regularly</p>	Shipowner / Crew	17/04/2020	continuous	III
3	It must verify that there is nothing that prevents the manoeuvres of detaching and launching life rafts; cords of the inflatable rafts container should always be firmly tied to a boat. Paying particular attention to the expiration dates of life rafts and the automatic release systems	Shipowner / Crew	17/04/2020	continuous	III
3	Avoid sliding of cargo both in holds and on deck	Shipowner / Crew	17/04/2020	continuous	III
3	Do not sail with the freeboard mark submerged	Shipowner / Crew	17/04/2020	continuous	III
3	There must be always staff on duty at the bridge	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

3	Test periodically general emergency alarm systems	Shipowner / Crew	17/04/2020	continuous	III
3	Do not overload with the heavy weights the high places in the vessel	Shipowner / Crew	17/04/2020	continuous	III
3	It is recommended to have survival suits for the entire crew	Shipowner / Crew	17/04/2020	continuous	III
3	Carry out regular drills and record them in the Logbook	Shipowner / Crew	17/04/2020	continuous	III
3	Muster chart should be displayed in a place common to all crew as well as the fire fighting and safety plan	Shipowner / Crew	17/04/2020	continuous	III
3	Regularly review and before each voyage the lifebuoys which must be labelled with vessel's name, light, and reflective tape	Shipowner / Crew	17/04/2020	continuous	III
3	The pelican hooks in the area of life rafts must be free of rust, paint or other material that slows the detaching and throwing	Shipowner / Crew	17/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

3	Regularly review the hydrostatic release system equipment of life rafts	Shipowner / Crew	17/04/2020	continuous	III
3	Reviewing before each trip that each cabin has a life jacket equipped with light and battery and whistle for everyone in the cabin	Shipowner / Crew	17/04/2020	continuous	III
3	The rescue facilities must be identified at any time by marking them	Shipowner / Crew	17/04/2020	continuous	III
3	Periodic check up of grabbing elements of cargo and objects in general	Shipowner / Crew	17/04/2020	continuous	III
3	Use extreme precautions in navigation in bad weather, ensuring an adequate state of weights through the appropriate ballast of the vessel	Shipowner / Crew	17/04/2020	continuous	III
3	Keep operative the VHF and navigation equipment such as AIS during fishing trips	Shipowner / Crew	25/04/2020	continuous	III
3	Adequate cargo stowage to avoid sliding or overloading part of the vessel both in holds and on deck	Shipowner / Crew	25/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

3	Evacuation and meeting point charts should be displayed in all crew common areas as well as the fire fire-fighting and safety plan	Shipowner / Crew	25/04/2020	continuous	III
4	Manoeuvre the vessel with good marine habits, always complying with the rules of collision or boarding	Shipowner / Crew	17/04/2020	continuous	III
4	Have on board VHF to communicate regularly reviewing it	Shipowner / Crew	17/04/2020	continuous	III
4	Having life-saving and survival equipment that requires regulation, which must be subject to periodic reviews	Shipowner / Crew	17/04/2020	continuous	III
4	Use extreme precautions in night navigation, or poor visibility conditions	Shipowner / Crew	17/04/2020	continuous	III
4	Never leave the bridge unattended	Shipowner / Crew	17/04/2020	continuous	IV
4	Wear shoes or boots with slip-resistant soles	Shipowner / Crew	25/04/2020	continuous	III

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

4	Maintain the accesses and stays in good conditions. Regular checks.	Shipowner / Crew	25/04/2020	continuous	III
5	Using the navigation charts of the area where sailing	Shipowner / Crew	17/04/2020	continuous	IV
5	Avoid getting too close to the coast	Shipowner / Crew	17/04/2020	continuous	IV
5	Maintaining optimal government of the vessel	Shipowner / Crew	17/04/2020	continuous	IV
5	Conducting periodic revisions to the systems of aid to navigation	Shipowner / Crew	17/04/2020	continuous	IV
5	Never leave the bridge unattended	Shipowner / Crew	17/04/2020	continuous	IV
6	Carry out regular preventive maintenance of propulsion systems and government of vessel	Shipowner / Crew	17/04/2020	continuous	IV

**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE OF EVALUATION	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020			CHECKUP DUE TO ACCIDENT

6	Enlist crew qualified and entitled to handle the engine room	Shipowner / Crew	17/04/2020	continuous	IV
6	Bring tools and essential spare parts on board to conduct emergency repairs	Shipowner / Crew	17/04/2020	continuous	IV
6	Check periodically communication systems between bridge, engine room and servo cabin	Shipowner / Crew	17/04/2020	continuous	III
7	The vessel will have preventive technical maintenance in relation to the water tightness of vessel, resistance and protection of the hull; bulkheads and doors watertight; state of closing the hatches, portlights and casing; revision of closure of ventilations	Shipowner / Crew	17/04/2020	continuous	III
7	Periodically review the general and emergency bilge pump system	Shipowner / Crew	17/04/2020	continuous	III
8					

**OBSERVATIONS**

Periodically, the crew will conduct drills/emergency exercises, and writing them on record in the logbook



**FILLING CARD Nº 3: INTEGRATED PREVENTIVE PLANNING**

SHIPOWNER:	ARVI			TYPE	X	INITIAL
VESSEL:	FISHING TRAWLER	DATE	17/04/2020	OF EVALUATION		CHECKUP DUE TO ACCIDENT

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## LU 1. 4 - Description of the procedures and applicable legislation

This section includes the description of the procedures of the emergencies that have been developed on the previous step.

The following six emergencies' procedures are described:

MAN OVERBOARD, FAILURE OF MACHINES OR MANEUVER, DANGER (GROUNDING, COLLISION, FOG, LOSS OF STABILITY, BAD WEATHER, ETC.), FIRE, ABANDONSHIP, FLOODING TAKING WATER.

The following elements are described for these emergencies:

1. CREW: 10 crew members (the first 7 make up the minimum crew / maximum crew 12)
2. SAFETY DEVICES AND ELEMENTS WITH WHICH YOU WILL INTERACT
3. METING POINT
4. COMMUNICATION SIGNAL IN CASE OF THE SPECIFIC EMERGENCY
5. SCENARIO
6. EMERGENCY BRIGADE COMPOSITION
7. CREW FUNCTIONS

## MAN OVERBOARD

1. **CREW: 10 crew members (the first 7 make up the minimum crew / maximum crew: 12):**

- a. Skipper in charge / Captain
- b. First mate / Deck officer
- c. Chief Engineer / First Engineer
- d. Greaser / Second Engineer
- e. Sailor nº 1 / Boatswain
- f. Sailor nº 2
- g. Sailor nº 3
- h. Sailor nº 4
- i. Sailor nº 5
- j. Sailor nº 6

2. **SAFETY DEVICES AND ELEMENTS WITH WHICH YOU WILL INTERACT:**

- a. Lifebuoys
- b. Lifebuoys with light and smoke signal
- c. Smoke signal
- d. Life vest radio beacon and detection equipment on the bridge
- e. Embarkation ladders (one for each side of the ship)
- f. VHF's (2)
- g. Communication system with rescue center (GMDSS)
- h. Other means to be considered:
  - i. O (Oscar) man overboard flag
  - ii. Lighting bulbs (if necessary due to lack of light)
  - iii. Crane of the ship (in case of having to hoist the castaway)
  - iv. Safety harness and lifeline (for the rescuer)
  - v. Survival suit

3. **MEETING POINT:**

- a. Upper deck

**4. COMMUNICATION SIGNAL OF MAN OVERBOARD:**

- a. Sound formed by 3 long blows
- b. Loudly (any crew member who sees a crewman fall into the sea will call "MAN OVERBOARD" on the port or starboard side and will not stop screaming until the Captain or Officer becomes aware)

**5. SCENARIO:**

- a. Upper deck (Deck -bridge- sea)

**6. COMPOSITION OF THE EMERGENCY BRIGADES:**

- a. Skipper in charge / Captain: Chief of Emergency
- b. First mate / Deck officer (Brigade chief)
- c. Sailors nº 1/2/3/4/5/6 / Boatswain (Intervention team)

**7. CREW FUNCTIONS:**

**a. SKIPPER IN CHARGE / CAPTAIN:**

Direct all operations to the ship's government. Will mark the position of the MOB. Will mark the position of the ship with respect to the MOB..Will alert the crew.Will activate the vest's radio beacon tracking system by following the signal trace. Inform the engine room of the situation and let them know that manoeuvring will be required. Engage hand steering. Will carry out an approach maneuver to the castaway (see maneuvers) placing the boat upwind of it. Keep an eye on radar/ARPA.It will alert potential nearby ships and the rescue center by means of a digital selective call and will subsequently send a message "PAN PAN PAN" on channel 16. Will report on the events and the end of the event.Will carry a VHF to maintain constant communication with the deck.

**b. FIRST MATE / DECK OFFICER**

Will be under the command of the Captain, coordinating with him the internal communications.Will carry a VHF with which it will maintain

communication with the bridge. Go to the area of the castaway fall and direct the rescue maneuver.

Command:

- the launching of lifebuoys needed.
- The unfolding of embarkation ladders
- The arrangement of the lighting bulbs to the sea (if this is deficient)
- The raising of the flag O.
- The use of the crane if necessary.

Will assess the state of health of the castaway once rescued, taking care of him/her medically.

c. **CHIEF ENGINEER/ FIRST ENGINEER**

At the orders of the Skipper in charge / Captain

d. **GREASER / SECOND ENGINEER**

At the orders of chief engineer.

e. **SAILOR Nº 1 / BOATSWAIN**

At order of first mate will shout the alarm of MAN OVERBOARD indicating the side of the ship.

Will launch a lifebuoy equipped with light (night) or smoke signal (day), trying to get as close as possible to the castaway. Won't lose sight of the castaway. (use binoculars). Will point at all times with arm outstretched. At the orders of the first mate or deck officer.

f. **SAILOR Nº 2**

Same as sailor 1

g. **SAILOR Nº 3**

Will go to the falling zone with lifebuoys.

Will launch a lifebuoy in the moment the castaway's approach maneuver begins.

At the orders of the first mate or deck officer.

**h. SAILOR Nº 4**

Same as sailor 3

**i. SAILOR Nº 5**

Will unfold the embarkation ladders.

Will direct the light bulbs towards the castaway.

He will be dressed in an immersion suit and harness anchoring it to a lifeline. It will help the castaway to board if necessary, using the crane and a sling that will be held by the buckle of the castaway's life vest.

At the orders of the first mate or deck officer.

**j. SAILOR Nº 6**

Same as sailor 5

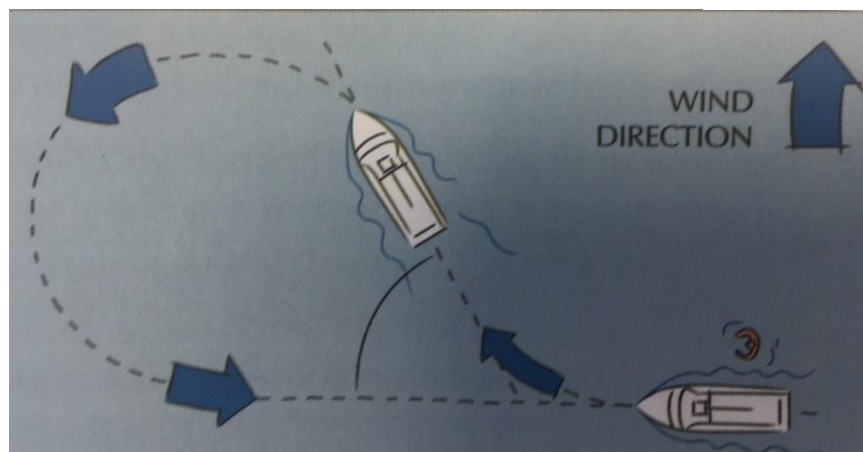
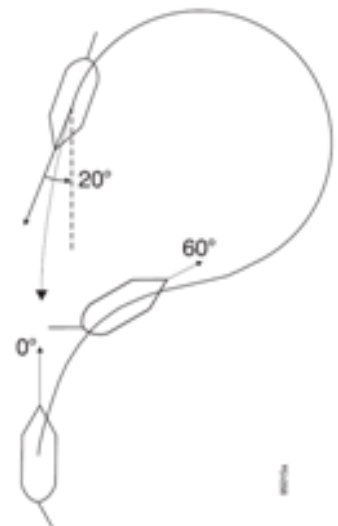
**k. REST OF CREW (if it were the case)**

Will go to the meeting point awaiting instructions

**APPROACH MANEUVER TO CAST AWAY**

**Williamson turn**

- Make good to the original track line
- Effective with reduced visibility
- Simple
- Takes the ship farther away from the scene of the incident
- Williamson turn: Rudder hard over, to the side of the casualty. After deviation from the original course by 60°, rudder hard over to the opposite side. When heading 20° short to the opposite course rudder to midship position and ship to be turned to opposite course.



## DANGER (GROUNDING, COLLISION, FOG, LOSS OF STABILITY, BAD WEATHER, ETC.)

1. **CREW: 10 crew members (the first 7 make up the minimum crew / maximum crew: 12):**

- a. Skipper in charge / Captain
- b. First mate / Deck officer
- c. Chief Engineer / First Engineer
- d. Greaser / Second Engineer
- e. Sailor nº 1 / Boatswain
- f. Sailor nº 2
- g. Sailor nº 3
- h. Sailor nº 4
- i. Sailor nº 5
- j. Sailor nº 6

2. **SAFETY DEVICES AND ELEMENTS WITH WHICH YOU WILL INTERACT:**

- a. VHF (3)
- b. Communication system with rescue center (GMDSS)
- c. Other means to be considered:
  - i. Various rescue devices to carry out a possible abandonment of the ship if necessary (collision, loss of stability, stranding, ...)

3. **METING POINT:**

- d. Upper deck

4. **COMMUNICATION SIGNAL IN CASE OF DANGER:**

- e. Sound formed by a succession of more than six short whistles followed by a long whistle, made with the ship's whistle or siren.
- f. With life voice

5. **SCENARIO:**

- g. Deck (Deck- bridge – engine room)

## 6. EMERGENCY BRIGADE COMPOSITION:

- h. Skipper in charge / Captain: Chief of emergency
- i. First mate / Deck officer Chief of brigade)
- j. Chief engineer / greaser/ sailors nº 1/2/3/4/5/6 / Boatswain  
( Intervention team)

## 7. CREW FUNCTIONS:

### k. SKIPPER IN CHARGE/ CAPTAIN:

- Will direct all operations.
- Will direct all the operations ordering the most convenient courses and regimes of machines.
- Will alert the crew.
- Will alert potential nearby ships.
- Will alert the rescue center by means of a digital selective call and later will send a message "PAN PAN PAN" on channel 16.
- Will report on the events.
- Will carry a VHF to maintain constant communication with the deck

*Procedure for collision differs from the procedure for grounding*

- Order to close watertight doors and automatic fire doors.
- Exhibit "Not Under Command" lights & shapes
- Muster firefighting/ spill party
- Muster lifeboat party 17. Give GMDSS Officer vessel's position.  
Master
- Assess damage to hull, tanks peaks, Engine Room, Pump Rooms & cargo
- Check cargo, fuel, steam, hydraulic pipelines & valves for fracture/ leaks.
- Check for oil spills & internal and/ or over side pollution (if yes then address SOPEP)
- Mark course recorder.
- Note time of contact.
- The position of the vessels prior/ to/ and during the incident.
- Note all bridge times.



- Note all Engine Room times.
- Note course and speed at time of contact.
- Note angle of contact.
- If no signals were exchanged please explain the reasons.
- Check if other vessel requires assistance.
- Pay utmost attention when attempting refloating or detachment.
- Obtain from other vessel name port of registry type of cargo, whence bound, where bound.
- Check if other vessel requires you to stand by.

#### I. FIRST MATE / DECK OFFICER

- Will be under the immediate command of the Captain.
- Will investigate the danger and report to the Bridge.
- Will supervise the operations on location.
- Will be under the command of the Captain, coordinating with him the internal communications.
- Will carry two VHF's, delivering one of them to the chief engineer.
- Will maintain communication with the bridge and engine room.

*Procedure for collision differs from the procedure for grounding*

- Switch to manual steering.
- Switch on deck lights (at night)
- Call Master to bridge if not already at the bridge
- Switch On VHF - Channel
- Advise Engine Room
- Exhibit "Not Under Command" lights & shapes
- Muster firefighting
- Muster lifeboat party
- Check for injuries and/ or missing persons
- Broadcast URGENCY or DISTRESS message, if appropriate.
- Check cargo, fuel, steam, hydraulic pipelines & valves for fracture/ leaks.
- Check for oil spills & internal and/ or over side pollution (if yes then address SOPEP).
- Mark course recorder.
- Note time of contact.
- The position of the vessels prior/ to/ and during the incident.
- Note all bridge times.

- Note all Engine Room times.
- Note course and speed at time of contact.
- Note angle of contact.
- If no signals were exchanged, please explain the reasons.

**m. CHIEF ENGINEER / FIRST ENGINEER**

- Will be in the Engine Room.
- Will coordinate the functions of his department, taking care of the operation of the propeller motor, auxiliaries and electrical panel.
- Will decide with the first mate the measures to be taken and act together with him.
- At the orders of the First Mate / Deck Officer.
- Will carry a VHF.
- Sound all tanks, wells and bilges including Engine Room, void spaces and cofferdams.
- Assess damage to hull, tanks peaks, Engine Room, Pump Rooms & cargo

**n. GREASER / SECOND ENGINEER**

He will assist the Chief Engineer in his duties

**o. SAILOR Nº 1 / BOATSWAIN**

Will go to the Bridge under the Captain's orders.  
At the command of the Captain / Skipper in charge.

**p. SAILOR Nº 2**

Will assist the Boatswain in his duties

**q. SAILOR Nº 3**

Under the First Mate orders

Will proceed to close watertight doors, wickets, hatches of the superstructure and deck, stagnant and compartmentalized the ship

**r. SAILOR Nº 4**

Will assist Sailor nº 3

s. **SAILOR N° 5**

Will assist Sailor n° 3

t. **SAILOR N° 6**

Will assist Sailor n° 3

u. **REST OF CREW ( if it were necessary)**

Will go to the meeting point awaiting instructions

## FIRE:

**1. CREW: 10 crew members (the first 7 make up the minimum crew / maximum crew: 12):**

- a. Skipper in charge / Captain
- b. First mate / Deck officer
- c. Chief Engineer / First Engineer
- d. Greaser / Second Engineer
- e. Sailor nº 1 / Boatswain
- f. Sailor nº 2
- g. Sailor nº 3
- h. Sailor nº 4
- i. Sailor nº 5
- j. Sailor nº 6

**2. SAFETY AND FIRE FIGHTING DEVICES (Fire and safety plan of the ship NOVO MORRIÑA is attached) AND ELEMENTS WITH WHICH IT WILL INTERACT:**

- a. ABC Portable Powder Fire Extinguishers
- b. Portable CO2 fire extinguishers
- c. Mobile powder fire extinguisher
- d. Fixed CO2 system
- e. Fire hydrants consisting of hose, lance and fire pump
- f. Smoke and heat detectors
- g. Detection and alarm panel
- h. Complete firefighter outfit
- i. VHF's
- j. Communication system with rescue center (GMDSS)
- k. Fuel valves and remote emergency stops
- l. Other means to be considered:
  - i. Watertight doors
  - ii. Fan emergency stops
  - iii. Fan locks / doors
  - iv. Emergency calls and alarms
- m. Assembly point

**3. MEETING POINT:**

- a. Upper Deck

**4. CALL SIGN AND COMMUNICATION OF THE FIRE TO THE CREW:**

- a. Continuous sound of general emergency alarm bells lasting more than ten (10) seconds

**5. POSSIBLE SCENARIOS OF BEGINNING OF A FIRE:**

- a. Engine room (bridge-deck-engine room)
- b. Cabin(bridge-deck-cabin)
- c. Kitchen (bridge-deck-kitchen)

**6. COMPOSITION OF FIRE FIGHTING BRIGADES:**

- a. Skipper in charge / Captain: Chief of emergency
- b. First mate / Deck officer (chief of brigade)
- c. Chief engineer / First engineer (Chief of intervention)
- d. Greaser / Second engineer (Interventin equipment: fire fighting)
- e. Sailor nº 1 / Boatswain (Interventin equipment assistant)

**7. FUNCTION OF THE CREW:**

**a. SKIPPER IN CHARGE/ CAPTAIN:**

- He will direct all operations by ordering the proper course and speed of engines.
- Will make the fire call informing to the crew
- It is responsible for both internal and external radio communications.
- If necessary, will give an alert to the rescue center by means of a digital selective call and will subsequently send a message "PAN PAN PAN".
- He will know at all times the evolution of the fire. Will carry a VHF.
- Will slow down or stop the ship and will position the ship according to the wind direction

**b. FIRST MATE / DECK OFFICER (CHIEF OF BRIGADE)**

- He will be under the command of the Captain, he will personally supervise the extinction maneuvers "on-site", coordinating the intervention brigade.
- Will inform to the bridge of the fire and development of operations. Will distribute the VHF's and carry one.

**c. CHIEF ENGINEER / FIRST ENGINEER**

He/she will direct the functions of his department taking care of the operation of the main and auxiliary engines. Will order the closings of the fuel valves, ventilation flaps and remote stops that it is consider necessary. Will activate the fire pump and will try to maintain water and pressure in the fire fighting pipeline. If the fire were in the engine room and impossible to extinguish with the portable or mobile means on board, will order the evacuation of the personnel. Will close watertight doors. Will trigger the fixed CO2 fire fighting system if necessary. Will verify the correct use of the firefighter equipment. Cut the electrical circuits necessary.

**d. GREASER/ SECOND ENGINEER**

He/ she will take the hose closest to the fire, prepare it and act under the orders of the chief engineer or first engineer. If the fire is located in the engine room or habilitation, will use the firefighter and autonomous breathing equipment. Will investigate the location, causes and characteristics of the fire, proceeding with its control and extinction. Will carry a VHF.

**e. SAILOR Nº 1 / BOATSWAIN**

Will take care of the use of fire hoses and hydrants, collect and handle portable fire extinguishers, and close fan covers. At the orders of the chief engineer or first engineer.

**f. SAILOR Nº 2**

Will go to the bridge to under the orders of the Skipper/ Captain.

**g. SAILOR N° 3**

Will assist in hose placement, carrying fire extinguishers, and closing fan covers. He will assist sailor n° 1 / boatswain. He will assist the greaser in the placement of the firefighter's equipment.

**h. SAILOR N° 4**

Will assist in hose placement, carrying fire extinguishers, and closing fan covers. He will assist sailor n° 1 / boatswain.

**i. SAILOR N° 5**

It will assist in hose placement, carrying fire extinguishers, and closing fan covers. Will assist sailor n° 1 / boatswain.

**j. SAILOR N° 6**

Will go to the Bridge under the orders of the Skipper / Captain.

**k. REST OF THE CREW (If applicable)**

Will report to the meeting point waiting for instructions

## ABANDON SHIP:

**1. CREW: 10 crew members (the first 7 make up the minimum crew / maximum crew: 12):**

- a. Skipper in charge / Captain
- b. First mate / Deck officer
- c. Chief Engineer / First Engineer
- d. Greaser / Second Engineer
- e. Sailor nº 1 / Boatswain
- f. Sailor nº 2
- g. Sailor nº 3
- h. Sailor nº 4
- i. Sailor nº 5
- j. Sailor nº 6

**2. SECURITY AND SAFETY DEVICES (Fire and safety plan of the ship NOVO MORRIÑA is attached) AND ELEMENTS WITH WHICH IT WILL INTERACT:**

- a. Lifejackets (1 for each crew member)
- b. Immersion suit (1 for each crew member)
- c. Life rafts (1 for each side of the ship with capacity for 100 % of the crew) and the accessories
- d. E.P.I.R.B radio beacon
- e. Radar transponder (2)
- f. Embarkation ladder (one in each side of the ship)
- g. VHF's portable radio (3)
- h. Global Maritime Distress Safety System (GMDSS)
- i. Other means to be considered:
  - i. Ship's documents
  - ii. Food Supplies and blankets
  - iii. Medicines
  - iv. Pyrotechnic signal
  - v. Line thrower

**3. MEETING POINT:**

- a. Upper deck



**4. CALL SIGN AND COMMUNICATION OF ABANDON SHIP:**

- a. Sound consisting of 7 short blows followed by one long
- b. Using loud voice

**5. SCENARIO OF ABANDONNING SHIP:**

- a. Upper deck (upper deck -bridge- sea)

**6. COMPOSITION OF THE ABANDONNING BRIGADE:**

- a. Situation a: abandoning ship on one side only using only one liferaft.
  
- b. Situation b: abandoning ship on both sides and with both liferafts. In this case:
  - i. Liferaft 1 port:
    1. Skipper / Captain: (Chief of liferaft)
    2. Chief engineer / first engineer
    3. Sailor n° 1 / Boatswain
    4. Sailor n° 3
    5. Sailor n° 5
    6. Rest of crew (odd)
  
  - ii. Liferaft 2 starboard:
    1. First mate / deck officer (chief of liferaft)
    2. Greaser / second engineer
    3. Sailor n° 2
    4. Sailor n° 4
    5. Sailor n° 6
    6. Rest of crew (even)

**7. FUNCTIONS OF THE CREW:**

**a. SKIPPER / CAPTAIN (CHIEF OF LIFERAFT 1) :**

- Command all operations and ensure that there is due order, both in the maneuver and in boarding in the liferafts. Liferafts and other equipment are released only on the order of the Captain Will transfer the documents to liferaft n° 1, assisted by the sailor n° 1.
- Send an alert to the rescue center through digital selective calling and will send a "MAY DAY" message. Sending of a MAYDAY distress signal by B.L.U and V.H.F: mention position - time - number of people on board

- Carry a VHF, a transponder and the Radio satellite Beacon.
- Pick up and put on his/her immersion suit and lifejacket.
- Record the position of the vessel, send a "MAYDAY" and give the position
- Go to the boarding area.

Launch the liferaft:

*Manual liferaft paunching procedure*

1. Check that one end of the painter of the raft is well secured to a strong point on ship's deck or structure.
2. Remove the lashing from the container of the raft and open the way to portable rail if available.
3. Check the ship side where the raft to be launched is clear.
4. Two people should lift the container from both sides horizontally and throw the container.
5. Make sure the painter is still fixed at a strong point so that the raft should not be waved away by waters.
6. Pull the painter with a hard jerk to fire the gas bottle to inflate the raft.
7. The life raft need time to inflate.
8. Jump into the water
9. Turn the liferaft (In this scenario the liferaft opened upside down)
10. Board the life raft one by one using ladder or rope.
11. Avoid sharp objects like knives, shoes and other sharp objects etc which may damage the raft surface.
12. When everybody is aboard, after a headcount, cut the painter with a sharp knife.

***Davit Release Liferaft Launching Procedure***

1. Open the lashing and remove the raft container from HRU by opening the manual slip hook or bottle screw arrangement.
2. Tie up the one end of the painter of raft into a strong point at deck.
3. Keep the container in the open and attach the davit hook to the given eye in the canister/ container
4. Take up the raft load by davit and keep the container hanging at embarkation deck area.
5. Pull the painter and inflate the raft. Have a thorough check on the inflated raft.
6. Start boarding the raft without the shoes and other sharp object.

7. After the boarding is completed, check the bottom is clear and release the securing lines.
  8. Someone inside the raft will detach the hook of the davit from the raft when raft is just above the water.
  9. The davit operating person will board the raft either by jumping into the sea, raft or by other boarding means if provided.
  10. Cut the painter and cast away the raft from ship.
- Once embarked, will sail away from the ship at a reasonable distance, to avoid possible mishaps when the ship sinks, remaining in the vicinity until rescued or find another mean of achieving it within their reach.
  - Will be responsible for the use and supply of all the utensils of the liferaft, such as medicines, food, distress signals, radio beacon, transponder,

**b. FIRST MATE / DECK OFFICER (CHIEF OF LIFERAFT 2)**

- Will be under the Captain's command, coordinating exterior and interior communications with him.
- Responsible for the collection of material (documentation, Radio Beacon, VHF and Transponders.
- Carry a transponder and a VHF.
- Pick up and put on his/her immersion suit and lifejacket.
- Gather the crew with their life jackets at the assembly point, control the crew at the assembly point and check the equipment
- Go to the boarding area.

Launch the liferaft:

*Manual liferaft launching procedure*

1. Check that one end of the painter of the raft is well secured to a strong point on ship's deck or structure.
2. Remove the lashing from the container of the raft and open the way to portable rail if available.
3. Check the ship side where the raft to be launched is clear.
4. Two people should lift the container from both sides horizontally and throw the container.
5. Make sure the painter is still fixed at a strong point so that the raft should not be waved away by waters.

6. Pull the painter with a hard jerk to fire the gas bottle to inflate the raft.
7. The life raft need time to inflate.
8. Jump into the water
9. Turn the liferaft (In this scenario the liferaft opened upside down)
10. Board the life raft one by one using ladder or rope.
11. Avoid sharp objects like knives, shoes and other sharp objects etc which may damage the raft surface.
12. When everybody is aboard, after a headcount, cut the painter with a sharp knife.

### ***Davit Release Liferaft Launching Procedure***

1. Open the lashing and remove the raft container from HRU by opening the manual slip hook or bottle screw arrangement.
  2. Tie up the one end of the painter of raft into a strong point at deck.
  3. Keep the container in the open and attach the davit hook to the given eye in the canister/ container
  4. Take up the raft load by davit and keep the container hanging at embarkation deck area.
  5. Pull the painter and inflate the raft. Have a thorough check on the inflated raft.
  6. Start boarding the raft without the shoes and other sharp object.
  7. After the boarding is completed, check the bottom is clear and release the securing lines.
  8. Someone inside the raft will detach the hook of the davit from the raft when raft is just above the water.
  9. The davit operating person will board the raft either by jumping in to the sea, raft or by other boarding means if provided.
  10. Cut the painter and cast away the raft from ship.
- Once embarked, will sail away from the ship at a reasonable distance, to avoid possible mishaps when the ship sinks, remaining in the vicinity until rescued or find another mean of achieving it within their reach.
  - Will be responsible for the use and supply of all the utensils of the liferaft, such as medicines, food, distress signals, radio beacon, transponder, ...

c. **CHIEF ENGINEER / FIRST ENGINEER**

- Prepare the engine room for abandonment.
- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Receive a VHF.
- Communication via VHF with first mate / captain
- Go to the boarding area
- In charge of organizing the launching of liferaft 1 on the port side and also the lifebuoys if necessary.
- Unravel all the material that can float (buoys, etc.).

Launch the liferaft:

*Manual liferaft paunching procedure*

1. Check that one end of the painter of the raft is well secured to a strong point on ship's deck or structure.
2. Remove the lashing from the container of the raft and open the way to portable rail if available.
3. Check the ship side where the raft to be launched is clear.
4. Two people should lift the container from both sides horizontally and throw the container.
5. Make sure the painter is still fixed at a strong point so that the raft should not be waved away by waters.
6. Pull the painter with a hard jerk to fire the gas bottle to inflate the raft.
7. The life raft need time to inflate.
8. Jump into the water
9. Turn the liferaft (In this scenario the liferaft opened upside down)
10. Board the life raft one by one using ladder or rope.
11. Avoid sharp objects like knives, shoes and other sharp objects etc which may damage the raft surface.
12. When everybody is aboard, after a headcount, cut the painter with a sharp knife.

***Davit Release Liferaft Launching Procedure***

1. Open the lashing and remove the raft container from HRU by opening the manual slip hook or bottle screw arrangement.
2. Tie up the one end of the painter of raft into a strong point at deck.
3. Keep the container in the open and attach the davit hook to the given eye in the canister/ container

4. Take up the raft load by davit and keep the container hanging at embarkation deck area.
5. Pull the painter and inflate the raft. Have a thorough check on the inflated raft.
6. Start boarding the raft without the shoes and other sharp object.
7. After the boarding is completed, check the bottom is clear and release the securing lines.
8. Someone inside the raft will detach the hook of the davit from the raft when raft is just above the water.
9. The davit operating person will board the raft either by jumping into the sea, raft or by other boarding means if provided.
10. Cut the painter and cast away the raft from ship.

**d. GREASER/ SECOND ENGINEER**

- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Go to the boarding area
- In charge of organizing the launching of the liferaft 2 on the starboard side and also the lifebuoys if necessary. Unravel all the material that can float (buoys, etc.).

Launch the liferaft:

*Manual liferaft paunching procedure*

1. Check that one end of the painter of the raft is well secured to a strong point on ship's deck or structure.
2. Remove the lashing from the container of the raft and open the way to portable rail if available.
3. Check the ship side where the raft to be launched is clear.
4. Two people should lift the container from both sides horizontally and throw the container.
5. Make sure the painter is still fixed at a strong point so that the raft should not be waved away by waters.
6. Pull the painter with a hard jerk to fire the gas bottle to inflate the raft.
7. The life raft need time to inflate.
8. Jump into the water
9. Turn the liferaft (In this scenario the liferaft opened upside down)
10. Board the life raft one by one using ladder or rope.
11. Avoid sharp objects like knives, shoes and other sharp objects etc which may damage the raft surface.

12. When everybody is aboard, after a headcount, cut the painter with a sharp knife.

***Davit Release Liferaft Launching Procedure***

1. Open the lashing and remove the raft container from HRU by opening the manual slip hook or bottle screw arrangement.
2. Tie up the one end of the painter of raft into a strong point at deck.
3. Keep the container in the open and attach the davit hook to the given eye in the canister/ container
4. Take up the raft load by davit and keep the container hanging at embarkation deck area.
5. Pull the painter and inflate the raft. Have a thorough check on the inflated raft.
6. Start boarding the raft without the shoes and other sharp object.
7. After the boarding is completed, check the bottom is clear and release the securing lines.
8. Someone inside the raft will detach the hook of the davit from the raft when raft is just above the water.
9. The davit operating person will board the raft either by jumping into the sea, raft or by other boarding means if provided.
10. Cut the painter and cast away the raft from ship.

e. **SAILOR Nº 1 / BOATSWAIN**

- Go to the Bridge under the orders of the Skipper / Captain.
- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Deliver the VHF to chief engineer.
- Go to the boarding area.
- Board in liferaft 1.

**f. SAILOR Nº 2**

- Go to the Bridge under the orders of the Skipper / Captain.
- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Responsible for the recount at the meeting point of liferaft 2 and communication of the result to the chief engineer.
- Assist the greaser in his functions, among others the launching of the liferaft.
- Go to the boarding area.
- Board in liferaft 2.

**g. SAILOR Nº 3**

- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Responsible for the recount at the meeting point of liferaft 1 and communication of the result to the chief engineer.
- Assist the chief engineer in his functions, among others the launching of the liferaft.
- Go to the boarding area.
- Board in liferaft 1.

**h. SAILOR Nº 4**

- Collect food supplies in coordination with sailor 5.
- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Go to the boarding area.
- Board in liferaft 2.

**i. SAILOR Nº 5**

- Will collect food supplies in coordination with sailor 4
- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Go to the boarding area.
- Board in liferaft 1.

**j. SAILOR Nº 6**

- Will go to the Bridge and help sailor nº 1.
- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Go to the boarding area.
- Board in liferaft 2.



k. **REST OF THE CREW ( If applicable)**

- Take his/her immersion suit and lifejacket, go to the meeting point and put it on there.
- Go to the boarding area.
- Board in designated liferaft.

## FLOODING / TAKING WATER:

**1. CREW: 10 crew members (the first 7 make up the minimum crew / maximum crew: 12):**

- a. Skipper in charge / Captain
- b. First mate / Deck officer
- c. Chief Engineer / First Engineer
- d. Greaser / Second Engineer
- e. Sailor nº 1 / Boatswain
- f. Sailor nº 2
- g. Sailor nº 3
- h. Sailor nº 4
- i. Sailor nº 5
- j. Sailor nº 6

**2. SAFETY DEVICES AND ELEMENTS WITH WHICH YOU WILL INTERACT:**

- a. Automatic bilge pump
- b. Manual bilge pump
- c. Internal communication telephone (engine room with bridge)
- d. Alarm detection central
- e. Flood alarms: in the factory and in the engine room with control unit on the bridge and sound devices in the engine room
- f. VHF's.
- g. Conical blocks of different diameters
- h. Repair paste
- i. Wooden boards of different sizes or other somewhat more flexible material and construction-type props
- j. VHF's
- k. Communication system with rescue center (GMDSS)
- l. Other means to be considered:
  - i. Watertight doors
  - ii. Emergency stops in machinery in engine room
  - iii. Emergency calls
  - iv. Bottom valves and taps
  - v. Immersion suits and lifjackets

**3. MEETING POINT:**

- a. Upper deck
- b. **CALL SIGN AND COMMUNICATION OF FLOOD / WATERWAY TO CREW:**
- c. 1 long and 2 short beeps repeated for 15 seconds performed with the horn or with the general alarm bells.

**4. POSSIBLE SCENARIOS OF THE BEGINNING OF THE FLOOD:**

- a. Engine room (bridge-upper deck-engine room)
- b. Factory (bridge-upper deck-factory)
- c. Hold (bridge-upper deck-hold)

**5. EMERGENCY BRIGADE COMPOSITION:**

- a. Skipper in charge / Captain: Chief of emergency
- b. First mate / Deck officer (chief of brigade)
- c. Chief engineer / First engineer (Chief of intervention)
- d. Greaser / Second engineer (Intervention equipment)
- e. Sailor nº 1 / Boatswain (Intervention equipment assistant)

**6. FUNCTIONS OF THE CREW:**

**a. SKIPPER IN CHARGE/ CAPTAIN:**

Will make the emergency call informing the crew

Responsible for both internal and external radio communications.

Maximum responsible for the ship, will remain on the bridge. Responsible for radio communications.

Coordination with first mate / deck officer and chief engineer the actions to be carried out.

Main Engine(s) to stand-by, ships speed reduced to manoeuvring revs.

Maneuver ship as required to:

- Safeguard personnel.
- Reduce effect of flooding (if cause known).

Will give an alert to the rescue center by selective digital call and will subsequently send an emergency message.

Inform relevant shore/port state authorities or VTS dependent upon seriousness of situation but notifying the company in any event.

As a precaution, order to prepare survival craft & other lifesaving appliances (EPIRBS's etc), in this case ship to be stopped in water.

Maintain log/record of events and decisions.

If necessary, will give an alert to the rescue center by selective digital call and will subsequently send an emergency message.

Will be informed at all times of the evolution of the flood.

Will carry a VHF.

In the event that the waterway exceeds the drainage capacity of the pumps, before proceeding with the abandonment, will assess the possibility of ordering the opening of a door or hatch that evacuates the water to one of the lower areas of the ship, to temporarily improve its stability and prevent the ship of capsizing during abandonment operations.

Take a reading of the probes and:

- Calculate the effects of the waterway on stability and constraints
- Calculate the effects on the stability and the stresses of all corrective actions that can be taken
- Check if the ship has the pumping capacity to stop the rising water
- If the ship cannot spread the waterway, calculate the final effect on stability and constraints

Record on the logbook all actions or decisions taken

**b. FIRST MATE / DECK OFFICER (CHIEF OF BRIGADE)**

- Will be under the command of the Captain / Skipper. Will personally supervise the development of the emergency on-site, coordinating the intervention brigades.
- Will inform the command bridge of the development of operations.
- Will go to the meeting point.
- Distribution of VHF and will carry one.

Waterway below the freeboard deck:

- Together with sailor N° 1, will investigate the existence of water in compartments such as a holds and other compartments below the free-board deck (engine room).

- Once the waterway has been located, will inform the Skipper / Captain and assisted by sailor nº 1, the chief engineer and greaser will compartmentalize the space to prevent the flood from spreading to adjacent spaces.
- Will order the use of bilge pumps, and once the waterway is located, they will try to block it.

Waterway above the freeboard deck:

- Together with sailor Nº 1, will investigate the origin of the waterway, paying special attention to openings in the hull / deck (watertight doors, debris trap, fishing swamp doors).
- Once the waterway is located, will inform the Skipper / Captain and assisted by the sailor nº 1, chief engineer and the graser, will proceed to contain the water in the affected space.
- Will require the chief engineer to start the pumps and align the valves necessary for bilge.
- Will assess the possibility of blocking the waterway.

c. **CHIEF ENGINEER / FIRST ENGINEER**

- Will go to the meeting point and receive a VHF.
- Where the possibility exists, make preparation for oil pollution prevention (ref. SOPEP manual).
- Maintain log/record of events and decisions.

Waterway below the freeboard deck:

- In the event that the water way is in the engine room, will start the bilge pumps and investigate the origin of the water intake. If possible, along with the greaser, sailor nº 1 and officer will try to block the waterway.
- If it is not possible to determine the origin and the capacity of the pumps to drain is not enough to evacuate the incoming water, will evaluate the possibility of closing all the bottom taps and discharging in order to check whether this measure eliminates the entry of Water.
- In case of abandonment, will ensure that all watertight doors are closed and the engine room is perfectly compartmentalized.

Waterway above the freeboard deck:

- Will go to the engine room and attend to the operation of the main and auxiliary engines.
- Will order the greaser to start bilge pumps.
- Will go to the fishing factory and check the lines and valves of fish washers, discharges, etc. At the request of the first mate or deck officer, will drain water from the affected area.
- Will take into account the level of discharges with respect to the flotation depending on the immersion that the ship is acquiring with the flood
- Will carry a VHF

d. **GREASER/ SECOND ENGINEER**

- Will go to the meeting point
- Will assist the chief engineer in his/her duties.

e. **SAILOR Nº 1 / BOATSWAIN**

- Will go to the meeting point
- Will be under the command of the first mate/ Deck Officer, will be part of the emergency brigade. Will proceed to close all the watertight doors in order to compartmentalize all the spaces and prevent / delay the progression of the flood, and in its case, the sinking of the ship.
- As a precaution, prepare survival craft & other lifesaving appliances (EPIRBS's etc).

f. **SAILOR Nº 2**

- Will go to the meeting point
- Will assist sailor nº1 in his/her duties
- As a precaution, prepare survival craft & other lifesaving appliances (EPIRBS's etc).

g. **SAILOR Nº 3**

- Will go to the meeting point
- Will gather immersion suits / lifejackets, and take them to the meeting station, should they be needed. Then will go to the bridge under the command of the Captain / Skipper.

**h. SAILOR N° 4**

- Will go to the meeting point
- Will assist sailor n°3 in his/her duties

**i. SAILOR N° 5**

- Will go to the meeting point
- Will assist sailor n°3 in his/her duties

**j. SAILOR N° 6**

- Will go to the meeting point
- Will go to the Bridge under the orders of the Skipper / Captain

**k. REST OF THE CREW (If applicable)**

- Will report to the meeting point waiting for instructions

Keep pollution control equipment ready for use

*If possible, the crew members who come to the meeting point will do so carrying (not wearing) the immersion suit and lifejacket. Although later some sailors will be in charge of moving the aforementioned equipment to the meeting point.*

## LU 1. 5 - Possibilities of expanding the simulator

### 1.- OBJECTIVES

The aim of this report is to identify the possibilities of expansion of the simulator in terms of size and use.

### 2.- GENERAL PROCEDURE FOR EXPANDING THE SIZE

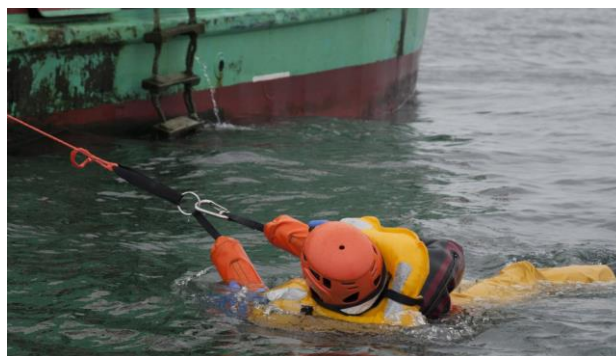
Three emergency scenarios on board fishing vessels are stressful situations in which the crew must follow specific guidelines and procedures to ensure their safety.

#### FIRE IN THE ENGINE ROOM



#### ABANDONING SHIP

#### MAN OVERBOARD





As it is an **Open educational resources** - OER, any VET entity would have the possibility to add new emergency cases or features to the simulator, e.g.:

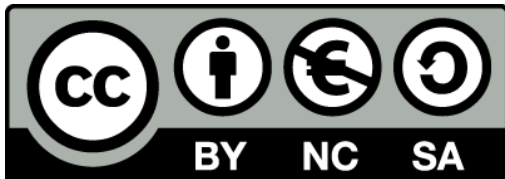
- PERSONAL ACCIDENTS.
- UNINTENTIONAL GROUNDING.
- ABOARDING.
- WATERWAYS AND FLOODING.

**The procedure consists of:**

The concerned entity of the type: VET, maritime training centre, etc. in developing new scenarios to be added to the VR-ME Project simulator should contact the consortium and make a formal request to obtain the simulator in source code to edit it.

The consortium will accept the application if the applicant entity commits by means of an agreement to comply with the requirements of use of the ERASMUS+ Programme.

For example:



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On the other hand, the consortium considers that the best way to further enhance the simulator would be another project, for reason that maritime training institutes are often not that interested in the fishing industry and therefore we may not expect huge investments for enhancing the simulator from their side.

Furthermore, if we would have the opportunity to enhance the simulator with new project, the training tool would be the same to every user. Difference in simulator training will make mutual recognition of certificates of competency, in which basic safety training is included, difficult and sometime impossible.

### **3.- GENERAL PROCEDURE FOR EXPANDING THE USE OF THE SIMULATOR**

A specific transversal Work Package (WP5 – Dissemination and Exploitation) was designed in order to disseminate the project and its results and to guarantee their exploitation and sustainability after project's end. The objective of this WP was to inform a wider audience about the project products in order to guarantee their use.

Whilst the dissemination actions foreseen by the VR-ME project addressed mainly the primary target group, the mainstreaming actions the consortium to addressed also the secondary and long term target groups. The mainstreaming actions guarantee the project sustainability and its products exploitation after its end.

We have been carrying out three different types of mainstreaming actions:

#### **- Direct Mainstreaming Actions:**

The partners in their daily work, organised training activities and workshops with fishing professionals. For instance ARVI, EUROPECHE and PFA are the main representatives of fishermen in their regions and EU level. SGS, IMP and SQL deliver VET in their daily activities focused on improving work safety. Most of them are in direct contact with marine professionals in their daily work to improve the work safety. These partners have included the VR-ME training within the services provided by their staff. This guarantees a direct exploitation of the project products by the partners in their daily activity that will last a long period after the end of the project.

### **- Vertical Mainstreaming Actions:**

These actions addresses mainly policy makers and public bodies at European, national and local level in order to raise awareness about the importance of adequate training for the safety of marine, and the need to integrate the results of the VR-ME project into wider practices and programmes, and replicate them in other context.

The partners have had and will have meetings with policy makers/ public bodies in order to make them aware of the existence of the training tools developed in the VR-ME project. Thanks to the collaboration of EUROPECHE, the project results has got to policymakers at EU level.

The final day /the multiplier event of the VR-ME project was held in the European Parliament (Brussels), organised by EUROPACHE and attended by the other partners. In addition to representatives of the European Parliament such as: Cor Blonk, President of the EU Social Dialogue Committee for Sea Fisheries and Gabriel Mato MEP, who participated as speakers and both praised the innovative tool and highlighted its contribution in terms of safety at sea for the training of the European fisheries sector. MEPs from different countries and political organisations were also present, as European Commission dg mare, North Sea Advisory Council, ENI CBC MED Programme, European Bureau for Conservation and Development | EBCD.



European Parliament welcomes virtual reality simulator for maritime emergencies date: July 12, 2022

SGS is involved in several networks in Brussels (e.g. TIC Council) who are in touch with EU institutions. Representatives of policy makers at local, national and European level were invited also to the project dissemination conference.

**- Horizontal Mainstreaming Actions:**

These actions address the primary and secondary target group aiming at using the VR-ME products. The objective of these actions is to use the VR-ME trainings in order to provide specific, high level technical skills to the workers of fishing sector and address the guidelines for emergencies.

The main target of these actions will be organisations/entities that have a direct contact with the project primary and secondary target groups, to offer them the training materials developed. The partners will visit and offer the possibility to sign agreements up to 3 organisations of the following type per country: fishing professional associations, VET providers and Port/Regional Authorities, as well as other organisations/bodies.

The Simulator will remain hosted in the project website with a non-significant cost. It will remain linked from SQLearn's website making it available for use free of charges. This will allow a huge number of potential users to take advantage of VR-ME, and a guarantee that contents will be kept online due to the low cost of maintenance. It will be enough just to access through web browser and download the software package to start using it in a PC with the VR Oculus device.

Dissemination Materials are also made freely accessible and downloadable, so they can be shared in either in electronic format or printed brochures.

Link for free download by the public and all interested parties:

[https://sidequestvr.com/search/apps/vrme?filter=%7B%7D&sortOn=query\\_rank&descending=true&limit=36&skip=0](https://sidequestvr.com/search/apps/vrme?filter=%7B%7D&sortOn=query_rank&descending=true&limit=36&skip=0)