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Firefighting Resource Management Simulator
Prototype
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Abstract

The Firefighting Resource Management Centre (FRMC) has been operationalized through a set of tools (Work System Analysis, Drill Designer, Condition Cards, and Debriefing Guide) intending to improve many aspects of the firefighting resource management on a ro-ro ship. This report presents the demonstration of these tools which was conducted as a two-day session performed at SAS training facilities in Jovellanos, Spain in January 2023. The session included theoretical lectures, workshops and two simulated fire drill including both a simulated bridge and actual fires. This report only presents the demonstration. The context and background are presented in D07.10 Deployment and validation of firefighting resource management simulator prototype (Skogstad et al., 2023).



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1 Executive summary

1.1 Problem definition

The LASH FIRE firefighting resource management centre (FRMC) is a concept that encompasses the technical, organisational, and human resources needed for safe and efficient fire response. The FRMC was defined in D07.4 (Skogstad et al., 2022), and includes the interaction of ship crew and their training needs, communication, and equipment use. The operationalization of the FRMC as a set of tools is described in D07.8 (Vicario et al., 2022) and the final tools are presented in D07.10 (Skogstad et al., 2023).

IMO regulations include rules on the frequency and content of fire-drills, and as such fire drills are an important avenue for the crew to consider and practice fire-emergencies. However, the learning outcomes of drills can be enhanced through simple means. In the LASH FIRE project, a set of tools has been developed to improve parts of the FRMC through improved learning outcomes from fire drills (see D07.8 (Vicario et al., 2022)). The final FRMC tools presented in this report are:

- **Work system analysis**, which is a functional model and graphical representation of the system of firefighting capabilities. The tool can be used to systematically identify factors that can affect fire safety on a specific vessel.
- **A Drill design template**, which is a tool to make use of insights derived from the other tools (work system analysis, debriefing guide) in the planning of drills.
- **Condition cards**, which can be used to facilitate the introduction of variability and the unexpected into safety discussions and drills.
- **Debriefing guide**, which support the learning from drills and the ability to gain feedback that can be systematically used in improvement work.

This report documents the demonstration performed at the Jovellanos Maritime Safety Training Centre (hosted by SAS, in Asturias, Spain), an onshore centre providing maritime fire training facilities, on January 18th and 19th, 2023.

1.2 Method

Demonstration and validation of the tools were performed at SAS training facility in Jovellanos, Spain. Workshops, table-top exercises and simulated drill scenarios were performed. The results from this simulation in the form of feedback from participants were used to assess the face validity of the tools, and a human-centered design evaluation.

This report has received input from LASH-FIRE deliverables D07.4 (Skogstad et al., 2022), D07.8 (Vicario et al., 2022) and D07.10 (Skogstad et al., 2023). The method section presented in this report is also included in D07.10 (Skogstad et al., 2023).

1.3 Results and achievements

The results in the report are from the successful simulation of the FRMC tools at SAS training facilities in Jovellanos, Spain. In short:

- Working with the **Work System Analysis**, participants experienced greater awareness of others' perspectives, and gained a more detailed understanding of the functions required in fire-emergency management. However, the tool was described as comprehensive and time-consuming, and may be more feasible to use for officers and land-organization, than sharp-end ship crews.

- The **Condition Cards** could be used to increase creativity and help introduce variance to the fire-drills in order to anticipate and train for unexpected events.
- **Debriefing guide** promoted more discussion among participants than regular debriefs, and could be useful to share experiences and making implicit knowledge explicit. However, participants emphasized that such a tool would not be used if it was too complex or making documentation too time consuming.

1.4 Contribution to LASH FIRE objectives

This report (alongside additional results presented in D07.10 (Skogstad et al., 2023) is contributing to the following LASH FIRE objectives:

- Strengthen the independent fire protection of ro-ro ships by developing and validating effective operative and design solutions addressing current and future challenges in all stages of a fire (LASH FIRE Objective 1).
- Reduce the potential for human error, accelerate time sensitive tasks and provide more comprehensive and effective decision support, by increased uptake of human centred design and improved design of tools, environments, methods, and processes for critical operations in case of fire (LASH FIRE WP07 Objective).
- Develop and validate a firefighting resources management centre (FRMC) with improved design for critical operations in case of fire, reducing the potential for human error, accelerating time sensitive tasks, and providing more comprehensive and effective decision support (LASH FIRE Action 7-C Objective).

1.5 Exploitation

The results from this report demonstrated that the FRMC tools developed in LASH FIRE can feasibly be utilized by ship operators – e.g. senior management on board or by shore management – to improve individual and organizational learning outcomes from fire drills. This will subsequently improve safety by reducing the potential for fire-emergencies, and by reducing the consequences if a fire-emergency should occur.

2 List of symbols and abbreviations

APV	Alternative Powered Vehicles
CCTV	Closed-circuit television
FRMC	Firefighting Resource Management Centre
VHF	Very High Frequency
VTS	Vessel Traffic Service
WAI	Work-as-imagined
WAD	Work-as-done
WSA	Work System Analysis

3 Introduction

Main author of the chapter: Martin Rasmussen Skogstad, NSR

This report documents the demonstration performed at the Jovellanos Maritime Safety Training Centre (hosted by SAS, in Asturias, Spain), an onshore centre providing maritime fire training facilities, on January 18th and 19th, 2023.

The demonstration also functioned as a test and validation of the Firefighting Resource Management Centre (FRMC), which have been operationalized as a set of tools to improve the firefighting resource management and overall fire safety on a ro-ro ship.

The four tools are:

- Work System Analysis (WSA)
- Drill Designer
- Condition Cards
- Debriefing Guide

For the final presentation of the tools see (Skogstad et al., 2023). The academic background supporting the FRMC including work-as-imagined (WAI) versus work-as-done (WAD) and resilience is presented in D07.8 Design Definition and Development of Firefighting Resource Management Simulator Prototype (Vicario et al., 2022).

4 The Simulation

Main author of the chapter: Brit-Eli Danielsen, NRS

The following sub-chapters (4.1- 4-2) presenting the demonstration are also included as part of D07.10 (Skogstad et al., 2023).

4.1 The Demonstration

The demonstration and evaluation of the solutions developed in this work package was performed at the Jovellanos Maritime Safety Training Centre (hosted by SAS, in Asturias, Spain), an onshore centre providing maritime fire training facilities, on January 18th and 19th, 2023. Five experienced seafarers from DFDS participated to the demonstration. The participants were all male and two of them were captains, while the others were chief officer, first engineer and first officer in their shipping company. They all had experience from ro-ro ships and some also from ro-pax ships. The participants were all actively contributing to discussions, workshops, and the fire simulations. The demonstration lasted for two days and consisted of theoretical lectures (given by NSR and NTNU), workshops (facilitated by NSR and NTNU) and practical fire simulations (administered by SAS).

4.1.1 Demonstration outline

<p>DAY 1</p> <p>09:00-11:00 Introduction</p> <p>11:00-13:00 Fire Simulation</p> <p>14:30-15:30 Standard debrief</p> <p>15:30-17:30 WSA</p>	<p>DAY 2</p> <p>09:00-11:30 Reflection, Drill Designer and Condition Cards</p> <p>12:00-13:00 Fire Simulation</p> <p>14:00-15:00 Drill Designer and Condition Cards cont'd</p> <p>15:00-16:00 Debriefing Guide</p> <p>16:00-16:30 Assessment of the two-day demonstration</p>
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DAY 1

09:00-11:00 Introduction

Day 1 started with an introduction by SAS including a short presentation round of participants and LASH FIRE project members, information about the Jovellanos training centre, the LASH FIRE research project and the plan for the two upcoming days. Informed consent was signed by all participants. SAS provided a familiarization tour of the facilities, including the bridge simulator and the fire ground.

11:00-13:00 Fire Simulation

The simulated fire scenario was set to be on board the *Magnolia Seaways*, using fire plans and other relevant documents from this ship. The fire was simulated to be in section 11 (Figure 1). The simulated scenario was fire in an APV while the ship was sailing in the Dover channel. Two of the participants acted as captain and first officer on the bridge, one participant acted as the runner while the rest of the participants formed a firefighting group to approach the fire on deck. The bridge was simulated in a bridge simulator (Figure 2) in the Jovellanos facilities. This room was equipped with a complete ship bridge simulator, telephone and VHF radios for communication with the fire team and external parties as well as live video from the fire location to simulate the CCTV on a real ship. The deck was simulated in a separate 'cargo hold' in the outside area of the Jovellanos facilities (Figure 4). The available firefighting equipment in the field consisted of fire blanket, fire hoses, drencher system and foam.

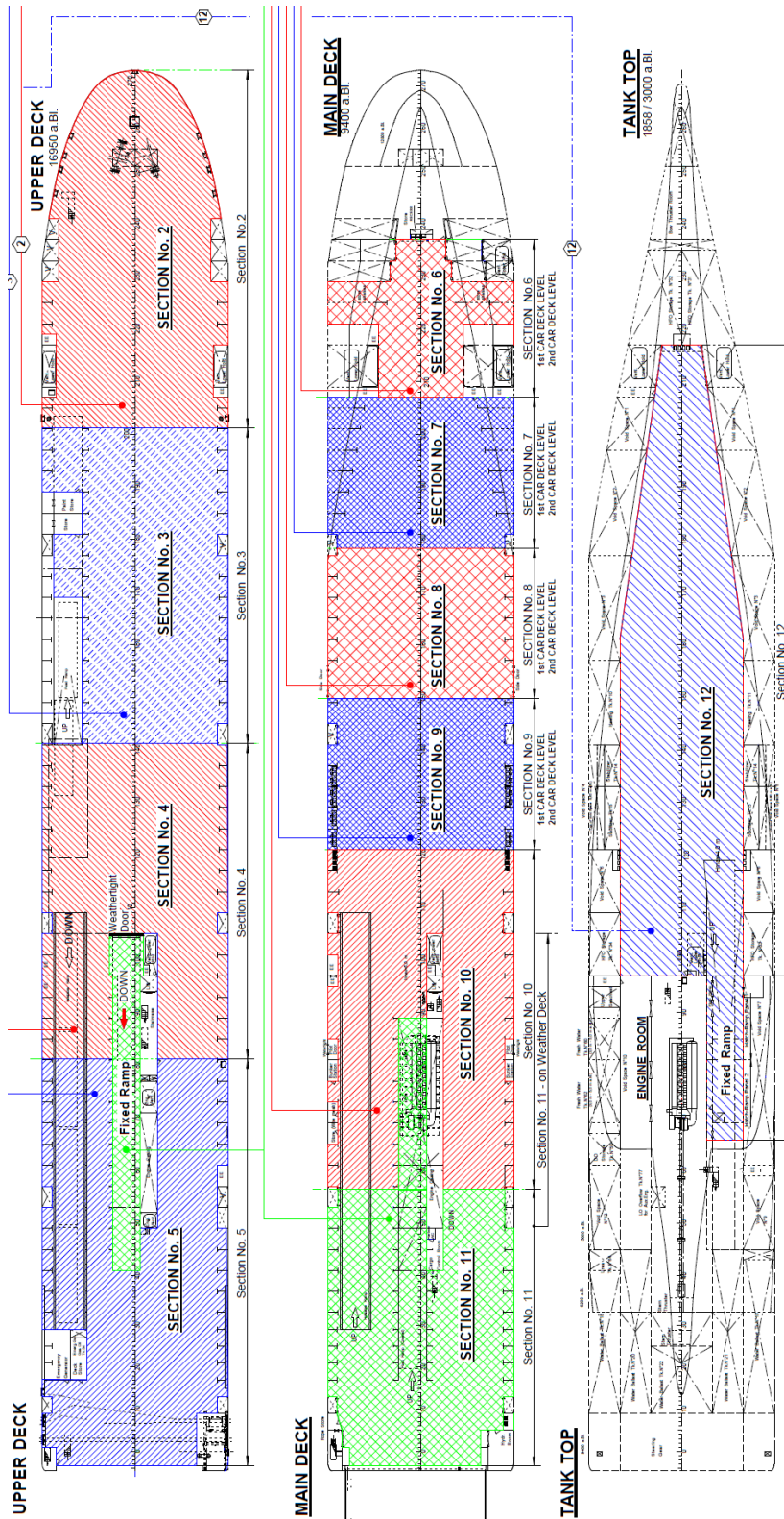


Figure 1 Magnolia Seaways drencher sections. The fire was simulated to be in Section 11.

Training instructors from Jovellanos were present at all locations to guide the participants through the exercise. The SAS training instructors located in the “back room” (Figure 3) coordinated the simulation and acted as personnel from other ships, the VTS and shipping company representatives that communicated with the bridge via telephone and VHF. In addition, five researchers from NTNU/NSR observed the participants in the bridge simulator, from the “back room” and in the field.

The researchers took notes, pictures, and video in order to document the event for evaluation and further research.



Figure 2. The bridge simulator.



Figure 3. Coordination of the simulation taking place in the "back-room".



Figure 4. The simulated fire ground.

14:30-15:30 Debrief

After completing the fire simulation, training instructors, researchers and participants gather in the classroom for a debrief session. The debrief was based on the standard debrief sessions as held on board ships after drills. The participants talked through the simulation scenario, what happened, what kind of challenges they encountered, what could have been done better and what went well.

15:30-17:30 WSA

This was a classroom section that started with a lecture introducing the theoretical background for developing the tools (NTNU) (Figure 5), before introducing WSA The work system analysis (NSR).

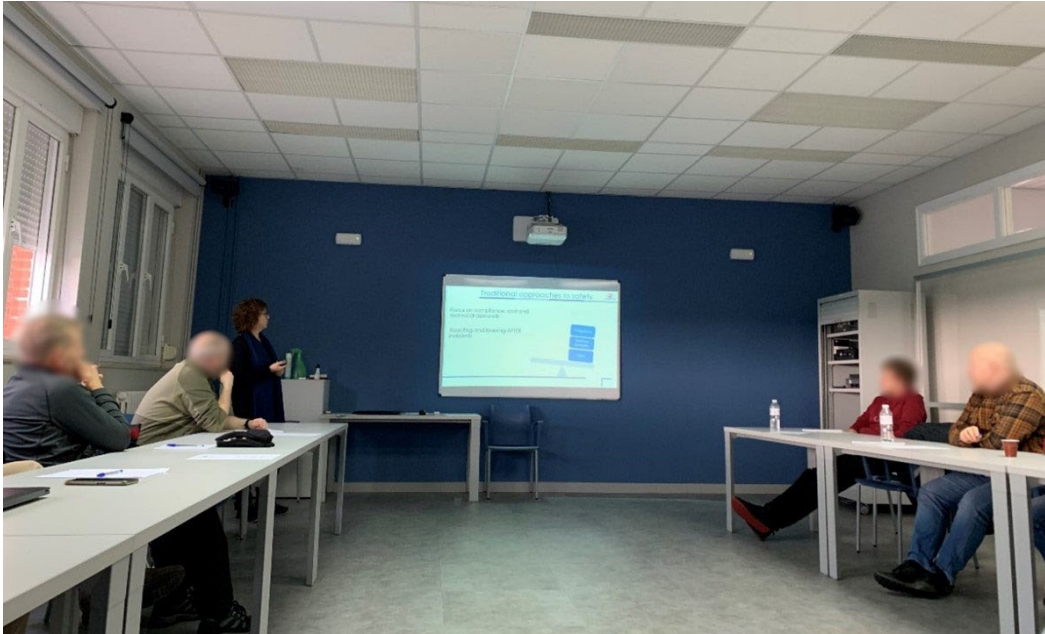


Figure 5. Lecture.

The remainder of this day was a workshop session in which participants were divided in two groups based on their roles during the simulation, the participants from the bridge and the runner in one group and the participants from the fire ground in the other group (Figure 6).

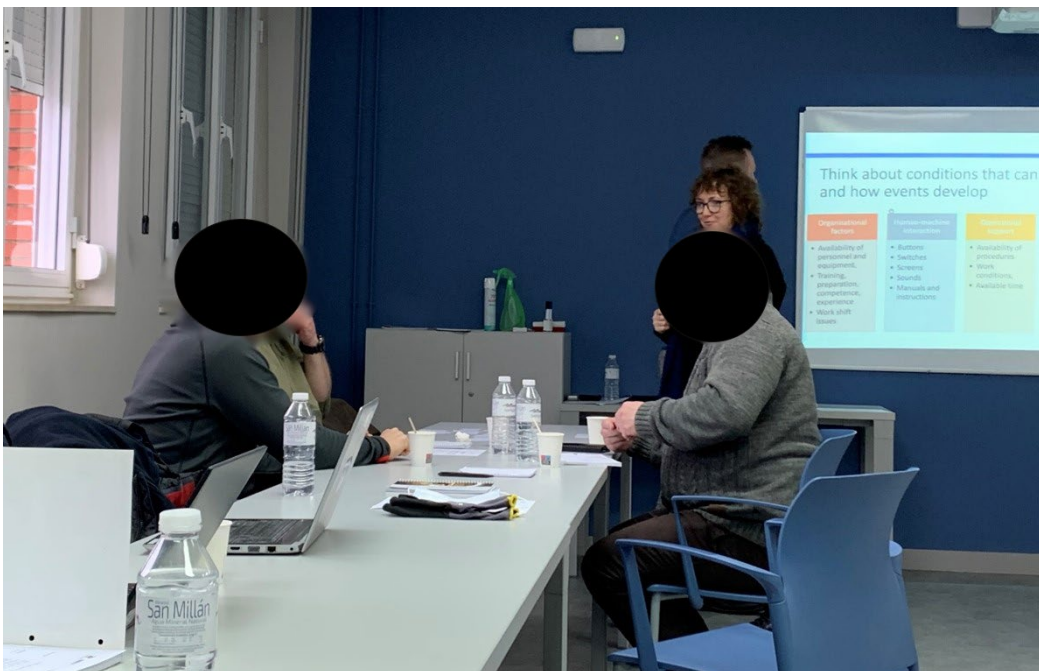


Figure 6. Workshop.

The groups were given the task to develop a Work System Analysis of the firefighting activity based on the simulation they just had participated to. The groups worked with help from a facilitator on demand. They wrote down functions and sub-functions on blank Function Cards and arranged them in their preferred hierarchical order on the table. The workshop session ended with a plenary session in which all participants discussed the work system analysis that had been developed by the two

groups. As the two groups had experienced the simulation from different sites, they had emphasized different functions in their analysis which facilitated the reflection and discussion about the different work systems on a ship and their inter-relations.

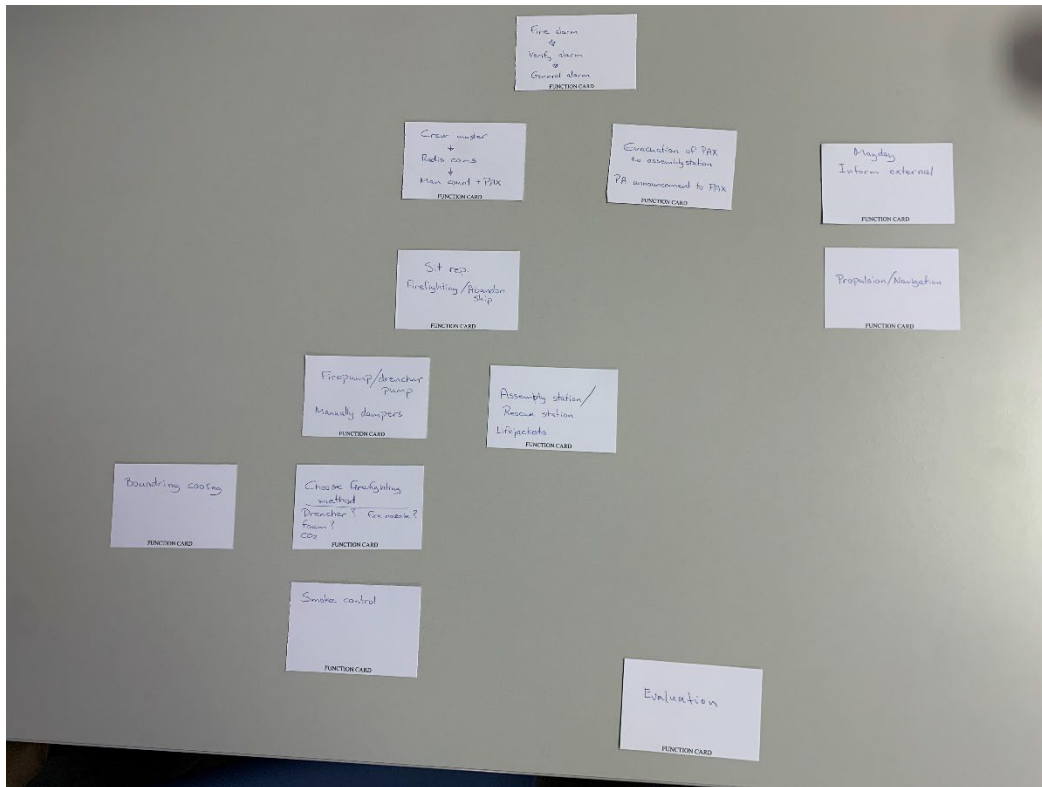


Figure 7. Development of the work system analysis.

DAY 2

09:00-11:30 Reflection and Condition Cards

Day 2 started with a classroom session in which participants reflected on their experience from Day 1, what were useful learning points from the theoretical and practical sessions.

The Condition Cards was introduced in a lecture format (NSR) before a workshop where participants applied Drill Designer was initiated.

The participants re-joined the groups from Day 1 and were asked to identify and discuss how the previously established functions in the work system analysis can vary. They wrote down variability on blank Conditions cards and placed them adjacent to their respective functions in their own work system. This workshop session ended with a plenary session in which all participants discussed the identified variabilities.

12:00-13:00 Fire Simulation (repeat of day 1 with a surprise element)

A fire simulation was performed also on day 2. This simulation replicated the simulated scenario from day 1, including the participants playing the same roles as the day before. However, the Day 2 scenario had additional (surprise) elements related to the discussion on variability in the previous workshop. The additional elements were placing magnesium in the car on fire and the discovery of an injured person that turned out to be a stow away.

14:00-15:00 Condition Cards cont'd

After the fire simulation the demonstration of Condition Cards continued in another classroom session. Condition cards that had been developed up front by the researchers were handed out, and there was a discussion on whether and how this tool can be used to develop the regular drills performed on board ships.

15:00-16:00 Debriefing Guide

A debrief session following the Day 2 fire simulation was facilitated by a researcher (NSR) using the developed debrief template (Debriefing Guide; Figure 21 Debriefing template)

16:00-16:30 Assessment of the two-day demonstration

The final classroom session was also led by a researcher (NSR) with the aim to collect feedback from the participants on the overall experience of the two days as well their impression of the three tools, in particular the usefulness of the tools and what would be critical for these solutions to be successful in real use.

4.2 Debriefing Guide - Debriefing tool demonstration

Debrief day one

After the demonstration each day, the participants met to discuss the event as they had unfolded in the scenario. For the first day, the debriefing session was led by the person being the captain for the demonstration. In this case the captain was asked to run through the debriefing session as he would have done after a regular drill. The debriefing to a large degree consisted with the debriefing leader going through a timeline of the event, with other crew members adding their opinions and thoughts. The debriefing and discussion lasted approximately 30 minutes.

Debrief day two

After the second day demonstration, the debriefing session was led by a member of the research team. The debrief session started by the researcher going through the instructions for the facilitator, and presented these to the crew in a manner the facilitator would. Utilizing the facilitator guideline (Table X) the researcher set the stage for the potential of safety improvement and learning from drills through:

- improving communication,
- being aware of unexpected events,
- being made aware of other crewmembers' tasks, adaptations that are made, and implicit knowledge they possess, by explicitly talking about it,
- being made aware of things that are working well, that one needs to preserve, and
- identifying aspects, the land-organization can improve.

Then the facilitator prompted the individuals to be in the right mindset to allow for open and good discussions during the debriefs. This was done by highlighting that:

- all crew members are competent and well-intentioned and working towards the shared goal of being better and safer during a fire-emergency,
- active participation is important,
- what crew members share will be listened and attended to,

- it is acceptable to be uncertain of something,
- speaking out when disagreeing and sharing unpopular ideas is encouraged,
- focus should be on what happened and why, and not who did what.

The facilitator then started on a high level and asked if any participants wanted to say something about what happened today. Depending on who answered, the facilitator ensured that perspectives of the bridge, runner, and fire-crew was promoted. The facilitator utilized the questions in Figure 20 Examples of questions to ask during the debriefing and Figure 21 Debriefing template. Questions were:

- What happened in the exercise today?
- Did anything unexpected happen?
- Was anything challenging, difficult or did not go as expected?
- Can you think of any conditions which would have changed the situation to the better or worse?
- What would happen in a worst-case scenario? How could you and your colleagues handle this?
- What went well (strengths)
- What could have gone better (weaknesses)

This debriefing session lasted approximately 30 minutes.

After the debriefing, the template (Figure 21 Debriefing template) was presented to the participants and its usefulness and issues with potential implementation in a real-world setting was discussed. The template was already filled out by the researchers based on what happened in the day two demonstration scenario.

After the template discussion, a more general discussion was undertaken where participants were prompted towards discussing their experiences with the second day debriefing. Questions probed whether the day two debrief (besides being led by the researcher) was any different from how they usually do drills, whether spending more time or effort on debriefs makes sense, and is feasible, and whether the format and template can be used to facilitate relevant discussion, improve learning, and involve the land-organization more in issues that are identified.

5 Conclusion

Main author of the chapter: Martin Rasmussen Skogstad, NSR

The demonstration of the FRMC tools and the simulated fire drills were considered a success by both the researchers, trainers and participants. See D07.10 (Skogstad et al., 2023) for the results of the validations of the FRMC tools obtained by the demonstration and simulation presented in this report.

6 References

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7 Indexes

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8 ANNEXES

8.1 ANNEX A Additional photos



Figure 8 The researchers used chest-mounted GoPro-cameras to collect video from the simulated drills



Figure 9 Outside view of the bridge simulator before the simulated drill



Figure 10 Fire alarm panel on the simulated bridge



Figure 11 Controls in the simulation bridge



Figure 12 CCTV in the simulated bridge

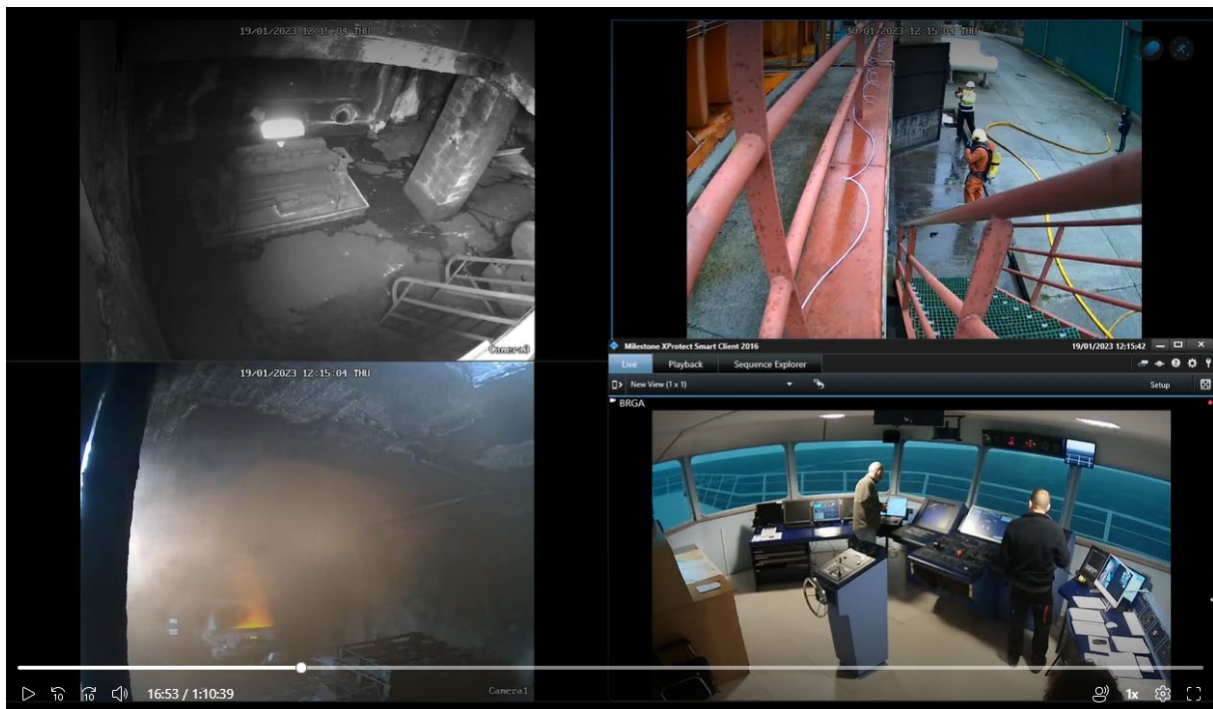


Figure 13 Screenshot from video provided by SAS. The video includes the CCTV feeds available at the bridge, but also a video of the bridge.

8.2 ANNEX B Workshop material

Drill planning template				
FIRE LOCATION	FIRE CHARACTERISTICS	PLANNED MEASURES	SCENARIO OUTLINE	
<p>Cargo space</p> <input type="checkbox"/> Weather deck <input type="checkbox"/> Open deck <input type="checkbox"/> Closed deck	<p>Ignition source</p> <input type="checkbox"/> Unknown <input type="checkbox"/> Faulty appliance/circuitry <input type="checkbox"/> Work on machinery <input type="checkbox"/> Exhausts <input type="checkbox"/> Spillage/leakage	<p>Fire team</p> <input type="checkbox"/> Muster <input type="checkbox"/> Donning of PPE <input type="checkbox"/> Hoses <input type="checkbox"/> Nozzles <input type="checkbox"/> Powder <input type="checkbox"/> Foam <input type="checkbox"/> Blanket <input type="checkbox"/> Fog nail	<p>VARIABILITY</p> <p>Crew</p> <input type="checkbox"/> Fear/stress/fatigue <input type="checkbox"/> Language barriers	
<p>Vehicle</p> <input type="checkbox"/> Conventional <input type="checkbox"/> Reefer <input type="checkbox"/> Electrical <input type="checkbox"/> Other alternative fuel.....	<input type="checkbox"/> Damp storage (linen etc) <input type="checkbox"/> Cooking oil (galley) <input type="checkbox"/> Smoking <input type="checkbox"/> Hand pressing iron <input type="checkbox"/> Laundry drying <input type="checkbox"/> Portable heater	<p>Fixed systems, cargo space</p> <input type="checkbox"/> Drenchers <input type="checkbox"/> High expansion foam <input type="checkbox"/> CO2		<p>Communication</p> <input type="checkbox"/> Interference/noise <input type="checkbox"/> Breakdown <input type="checkbox"/> Misunderstood instructions <input type="checkbox"/> Misunderstood feedback
<p>Goods</p> <input type="checkbox"/> General goods <input type="checkbox"/> DG dangerous goods	<p>Fuel</p> <input type="checkbox"/> Unknown <input type="checkbox"/> Solid organic material <input type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Metal	<p>Fixed systems, accommodations</p> <input type="checkbox"/> Sprinklers	<p>Accident/casualty</p> <input type="checkbox"/> Medical emergency <input type="checkbox"/> Injury/serious injury/death <input type="checkbox"/> Missing person <input type="checkbox"/> Stranding/collision <input type="checkbox"/> Serious material damage <input type="checkbox"/> Environmental damage	<p>Environmental conditions</p> <input type="checkbox"/> Severe weather <input type="checkbox"/> Tide/currents/wind <input type="checkbox"/> Seasonal variation (eg. ice) <input type="checkbox"/> Time of day (eg night)
<p><input type="checkbox"/> Undeclared DG <input type="checkbox"/> Other</p> <p>Machinery space</p> <input type="checkbox"/> Engine room <input type="checkbox"/> Boiler room <input type="checkbox"/> Pump room	<p>Hazards</p> <input type="checkbox"/> Toxic smoke <input type="checkbox"/> Explosion <input type="checkbox"/> Spread to multiple decks <input type="checkbox"/> Multiple fires <input type="checkbox"/> Thermal runaway (EV)	<p>Fixed systems, Machinery</p> <input type="checkbox"/> Halon <input type="checkbox"/> CO2 <input type="checkbox"/> High pressure mist	<p>Blocked access</p> <input type="checkbox"/> of firefighting equipment <input type="checkbox"/> of passageway <input type="checkbox"/> of muster station <input type="checkbox"/> ECR or safety center	<p>TRAINING OBJECTIVES</p> <p>Instruction</p> <input type="checkbox"/> Fire prevention <input type="checkbox"/> Equipment <input type="text"/> <input type="checkbox"/> Fire hazards
<p><input type="checkbox"/> Galley <input type="checkbox"/> Other</p> <p>Accommodations/ social spaces</p> <input type="checkbox"/> Crew accomm. <input type="checkbox"/> Crew social space <input type="checkbox"/> Pax accomm. <input type="checkbox"/> Pax social space	<input type="checkbox"/> Reignition <input type="checkbox"/> Flammable material adjacent	<p>Ventilation</p> <input type="checkbox"/> Reduce air supply <input type="checkbox"/> Isolate stairways, lifts <input type="checkbox"/> Other <p><input type="checkbox"/> Cabin check</p>	<p>Power loss</p> <input type="checkbox"/> Fire pumps <input type="checkbox"/> Switchboard <input type="checkbox"/> Lighting <input type="checkbox"/> Motors/navigation	<p>Familiarisation</p> <input type="checkbox"/> Equipment <input type="text"/> <input type="checkbox"/> Procedure <input type="text"/> <input type="checkbox"/> Location /activation of alarm <input type="checkbox"/> Escape routes, hatches etc
			<p>Operational readiness</p> <input type="checkbox"/> Muster efficiently <input type="checkbox"/> Venting strategies <input type="checkbox"/> Efficient extinguishment	<p>Particular focus on</p> <input type="checkbox"/> Communication <input type="checkbox"/> Team coordination <input type="checkbox"/> Safety awareness <input type="checkbox"/> Usability of equipment <input type="checkbox"/> Policy & safety rules <input type="checkbox"/> Instructions and labelling <input type="checkbox"/> Other <input type="text"/>

Figure 14 Conceptual design of a simple template to help vary drills and to define training objectives.



Fire drill plan		
Date:	Reference no:	Officer in charge:
Week:	Planned activities:	
Place of fire:		
Fire group meet:		
Limitation grp. meet:		
First aid grp. meet:		
Fire exercise:		
Training objectives:	Plan of action:	
Smoke generator (area):	Closing of fire doors <input type="checkbox"/> Yes <input type="checkbox"/> No	Closing of waterproof doors <input type="checkbox"/> Yes <input type="checkbox"/> No
Evacuation exercise:		
Training objectives:	Plan of action:	
Evacuation to (area):		
Rescue exercise:		
Training objectives:	Plan of action:	
Launched lifeboat no.:	With crew from:	
Safety Instruction <input type="checkbox"/> Yes <input type="checkbox"/> No	Team:	
Subject:	Cabin inspection:	
Various announcements/information:		
Persons exempt:	Persons not shown:	

Figure 15 Fire drill plan template



Figure 16 Condition cards prototype used in Jovellanos demonstration.



Figure 17. Three of the prototype Condition Cards.



Figure 18 Reverse side of a Condition Card



Debriefing Guide

Part 1 Facilitator tips

<p>Set goals</p>	<p>Setting specific goals for an exercise shows what is important during an exercise.</p> <p>Goals</p> <ul style="list-style-type: none"> · help structure learning and knowledge · motivate learners to respond to feedback · inspire self-monitoring and self-feedback · provide focus for observing and assessing performance
<p>Practical instructions</p>	<p>Select 3-5 focus areas for a debrief, rather than trying to cover too much.</p> <p>Let discussions stray from a topic, if the discussion appears relevant for improvement efforts.</p> <p>Avoid talking too much! Wait a little during silence: participants start talking after a while. Move on to another topic when participation and group discussion slows down.</p> <p>Showing pictures or video capture helps focus a discussion.</p>
<p>Provide feedback</p>	<p>Feedback should be specific and actionable.</p> <p>Feedback towards the group highlights the importance of team cohesiveness.</p> <p>Give one-on-one feedback for specific, performance-related issues.</p>
<p>Create conditions that support reflection and discussion</p>	<p>Communicate that the debriefing is important, and that what the participants share will be listened and attended to.</p> <p>Focus on "what happened and why"; avoid focus on "who did what".</p> <p>Experienced can crew contribute with knowledge to those who are less experienced. When team members understand each other's roles, they can give each other the right type of information and support. This helps group dynamics, and makes it easier to assume each others duties and responsibilities in the case of eg injury</p> <p>Contribute with their your own knowledge, e.g. with example from your own experience to clarify a point.</p>
<p>Ask questions that encourage self-feedback</p>	<p>Help participants reflect through:</p> <ul style="list-style-type: none"> - open-ended questions addressed to the group - specific follow-on questions addressed to individuals <p>Strive to let participants "own" the issues as well as the improvement suggestions</p>

Figure 19 Instructions for the person leading a debriefing



Part 2 Sample questions

How did we do?

- What happened today?
- What did we do well?
- Was there anything unexpected?
- Was anything challenging, difficult?

Variations and adaptations

- Mention one thing that could have been done differently
- Can you give me one example of conditions that could have affected the fire, how we handled it or our performance?
- What would a worst-case scenario be for this type of fire?

What should we do for the team

- to help each other get a clear idea of the situation?
- to make sure shared information is understood?
- to understand and support each others' tasks?
- to learn from one another?

Improvement potential

- Can anyone give me one example of how we could improve
 - equipment?
 - instructions or procedures?
 - communication?

Figure 20 Examples of questions to ask during the debriefing



Debriefing		
Date:	Time:	Officer in charge:
Week:		
What happened today?		
Did we meet the training objectives?		
Discussion topics:		
<input type="checkbox"/> What we did well <input type="checkbox"/> What could have been done differently <input type="checkbox"/> Unusual or unexpected events <input type="checkbox"/> Worst case scenario <input type="checkbox"/> Other	<input type="checkbox"/> Team work and communication <input type="checkbox"/> Workload <input type="checkbox"/> Handling equipment <input type="checkbox"/> Firefighting tactics <input type="checkbox"/> Maintenance issues <input type="checkbox"/> Instructions, information, procedures <input type="checkbox"/> Design issues <input type="checkbox"/> Deviations from SOP's	
Identified "risk scenarios" and safety issues		
Strengths and improvement suggestions		
Responsible for improvement:		

Figure 21 Debriefing template

Fire drill plan		
Date:	Reference no:	Officer in charge:
Week:	Planned activities:	
Place of fire:		
Fire group meet:		
Limitation grp. meet:		
First aid grp. meet:		
Fire exercise:		
Training objectives:	Plan of action:	
Smoke generator (area):	Closing of fire doors <input type="checkbox"/> Yes <input type="checkbox"/> No	Closing of waterproof doors <input type="checkbox"/> Yes <input type="checkbox"/> No
Evacuation exercise:		
Training objectives:	Plan of action:	
Evacuation to (area):		
Rescue exercise:		
Training objectives:	Plan of action:	
Launched lifeboat no.:	With crew from:	
Safety Instruction <input type="checkbox"/> Yes <input type="checkbox"/> No	Team:	
Subject:	Cabin inspection:	
Various announcements/information:		
Persons exempt:	Persons not shown:	

Debriefing		
Date:	Time:	Officer in charge:
Week:	What happened today?	
Did we meet the training objectives?		
Discussion topics:		
<input type="checkbox"/> What we did well	<input type="checkbox"/> Team work and communication	
<input type="checkbox"/> What could have been done differently	<input type="checkbox"/> Workload	
<input type="checkbox"/> Unusual or unexpected events	<input type="checkbox"/> Handling equipment	
<input type="checkbox"/> Worst case scenario	<input type="checkbox"/> Firefighting tactics	
<input type="checkbox"/> Other	<input type="checkbox"/> Maintenance issues	
	<input type="checkbox"/> Instructions, information, procedures	
	<input type="checkbox"/> Design issues	
	<input type="checkbox"/> Deviations from SOP's	
Identified "risk scenarios" and safety issues		
Strengths and improvement suggestions		
Responsible for improvement:		

Figure 22 The debriefing template can be printed on the reverse side of a drill checklist for practical purposes.