



OIL SPILL Project Report – Group of Activities 3.4

CONDUCTING SIMULATOR TRAININGS IN OIL SPILL RESPONSE TRAINING – THOUGHTS FROM THE RESPONSE CREWS

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ABOUT THIS REPORT

This report is an output of the OIL SPILL Group of Activities 3.4 that focuses on maritime simulation training. The work group is led by **the Estonian Maritime Academy of Tallinn University of Technology**. **The Marine Research Institute of Klaipėda University** participates in the activities.

The report presents the thoughts of the professionals involved in oil spill response operations regarding using exercises conducted on maritime simulator. The roadmap for future oil spill training using maritime simulators is also presented.

The authors thank the colleagues from the OIL SPILL project and especially the Project Office for the support, and all respondents for providing input.

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OIL SPILL PROJECT

The project *Enhancing oil spill response capability in the Baltic Sea region (OIL SPILL)* improved cross-border and cross-sectorial cooperation between and among relevant stakeholders in oil spill response in shallow waters and coastal areas in the Baltic Sea Region (BSR).

The overall goal was to strengthen oil spill response capability at all levels: key responsible ministries, operative competent authorities, key non-governmental organizations, relevant universities, and the petrochemical industry.

13 Partner organizations from six BSR countries formed the OIL SPILL consortium. Their core activities included joint tabletop, simulator, and live field exercises, the sharing of knowledge, and the dissemination of best practices.

OIL SPILL budget was 2.0 M €, and the Project was co-funded by the EU's Interreg Baltic Sea Region programme. The Project was in operation in 2019–2021.

Introduction

One of the main objectives of the OIL SPILL project in the view of response in shallow waters and coastal areas includes the identifying of administrative and other procedures regarding harmonisation and improvement of cross-border activities, including key legal issues.

The other main objective in the OIL SPILL project in the view of response in shallow waters and coastal areas includes the organisation and participation of cross-border exercises and training events such as short-term staff exchanges, live field exercises, table-top exercises and simulation exercises. This objective aims to enhance institutionalised knowledge and competence by filling the gaps in education and training, focusing on marine oil spill response.

The simulator training greatly contributes in achieving the set goals and objectives of the OIL SPILL project. The proposed simulator training would enable the “near-real” experience in the field of oil spill response by allowing the play-through of oil spill incidents. The training on maritime simulators incorporates all the knowledge utilised during real incidents starting from planning, cooperation, and for the most important part, the communication between different parties involved in the response procedure.

The Covid-19 pandemic that took over the world in the beginning of 2020, played an important role in achieving the set results of the project and the initially planned OIL SPILL Simulator Training Event was postponed several times and eventually cancelled. This report focuses on the results of the questionnaire conducted to find out the experts’ view on the suitability and necessity of maritime simulator training on oil spill response operations and brings out the roadmap for future trainings.

1. Small scale exercise and readiness for future oil spill related simulator trainings

In spite of the pandemic, TalTech Estonian Maritime Academy was still able to conduct a short simulator training for Estonian participants only. The small national scale exercise was conducted 21 May 2020, based on the scenario created for the BALEX Delta 2020 event (<https://helcom.fi/balex-delta-2020-regional-response-to-major-maritime-incidents-is-being-tested-in-estonian-waters/>).

Altogether nine participants from Estonian Maritime Administration, Estonian Police and Border Guard Board and Estonian Maritime Academy participated in the exercise.

The exercise was considered a good experience by the participants. Similarly to the answers gathered during the survey questionnaire, the necessity of this kind of training was considered high and general opinion was that simulator trainings could be held as refreshment training once a year in addition to live field-exercises.

Please read more about the exercise from OIL SPILL GoA 3.4 report on Conducting oil spill combating training with state-of-the-art maritime simulators, that was published in September 2020 (<https://blogit.utu.fi/oilspill/2020/09/09/new-report-conducting-oil-spill-combating-training-with-state-of-the-art-maritime-simulators/oilspill-go3-4-report-09092020-oil-spill-combating-training-with-state-of-the-art-maritime-simulators-2/>).

For the main OIL SPILL Simulator Training Event, the scenario (Annex 1) and the feedback questionnaire were prepared. Although, the scenario was not used during the simulator training, the developed feedback questionnaire (Annex 2) was modified to fill the purpose of getting feedback from field experts without the participation in the simulator exercise (Annex 3).

2. Experts' opinion on oil spill related simulator training

Due to Covid-19 restrictions, it was not possible to conduct the OIL SPILL Simulator Training Event at an international scale. Therefore, the exercise feedback survey was modified to a more general one for the target groups/potential participants to give feedback on their knowledge about and the need for oil spill related simulator exercises.

The questionnaire consisted of 7 questions (Annex 3) and enabled the respondents to give their insight to areas such as their previous experience and knowledge about oil spill related simulator trainings, the need for simulator trainings and what skills could be trained the best with these, the potential involvement of volunteers (NGOs) and suitability of simulator exercises for the training purposes.

The respondents were from Estonia, Lithuania, Sweden and Finland representing wide coverage of positions involved in oil spill response operations: response/rescue units, environmental authorities, volunteers (NGO's).

Maritime simulators enable the practicing of oil spill response and related procedure in the form of a simulated role-play. The training exercises on maritime simulators enable the practice of non-technical skills rather than hands-on training with oil spill response equipment. Half of the respondents had previously participated in simulator exercises, half of them not. 90% of the respondents evaluated their knowledge about maritime simulators and training exercises to be adequate (30%), basic (30%) or minimal (30%); 10% of the respondents had no knowledge about maritime simulators and training. Nobody evaluated their knowledge to be superior. (Figure 1)

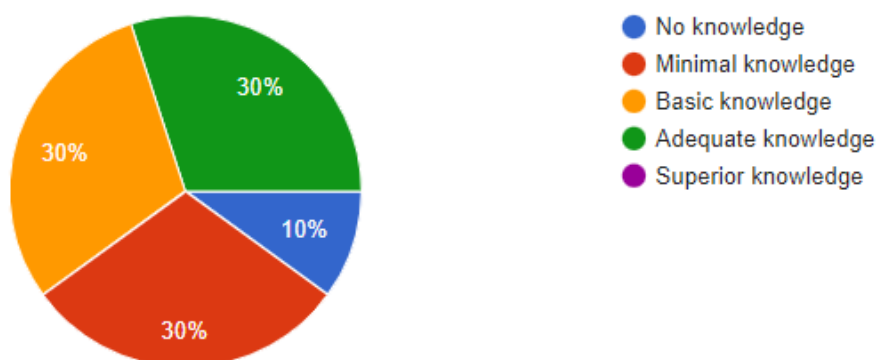


Figure 1. General knowledge about maritime simulators and training exercises.

The respondents saw the highest value in the ability to practice different scenarios in limited time and controlled environment. The advantage compared to a live-exercise is that simulator exercise can be paused at any point to conduct activity analyses, give comments and suggestions, as well as repeat some parts of the exercise, and then continued. The possibility to give and receive feedback during paused exercise was considered valuable for 60% of the respondents. Half of the respondents considered valuable the cost efficiency compared to live exercises, and the practicing cooperation in international setting.

The scenario for the simulator exercise is an important aspect to conduct a successful training event (Figure 2). 40% of the respondents believe that the exercise should be tailored to practice one (or several) specific procedures. It was equally thought that the exercise should be based on real live-exercise (e.g. BALEX Delta) (20%) or based on a real accident (20%) or made up for specific exercise (20%).

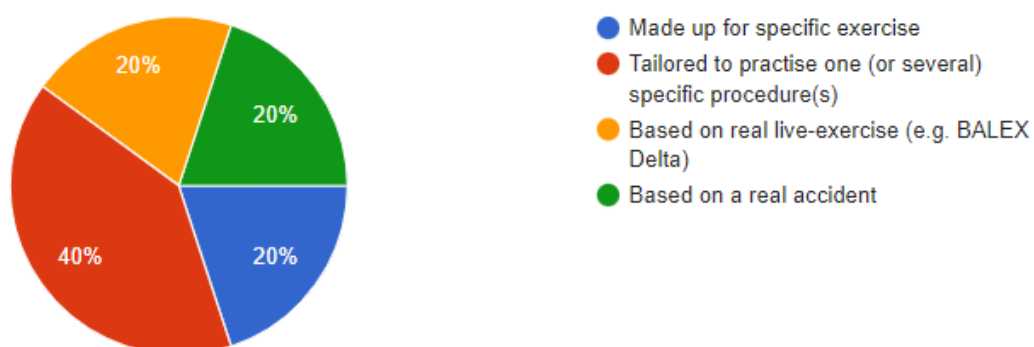


Figure 2. Scenario preferences for oil spill related simulator training.

Next the respondents were asked to evaluate the suitability of the simulator exercises to practice different skills. As the simulators enable the changing of information and commands through radio communication the advancing of communication skills was considered either highly suitable or suitable by all of the respondents. Same results were received for the enhancing of cooperation with different parties involved in the response operations. Practicing of standard operational procedures was mostly considered suitable (50%) and highly suitable (40%), minority of the respondents saw that it is only moderately suitable. Testing novel procedures was considered moderately suitable by 20% of the respondents, respectively 30% and 50% considered the testing of novel procedures either suitable or highly suitable. Clarifying the roles and responsibilities during response operations was considered suitable by 90% of the respondents. Making the work of maritime response coordination centres' more effective was evaluated highly suitable (40%) or suitable (40%). However, 20% only evaluated it to be moderately suitable.

The biggest differences came out when evaluating the suitability in involving volunteers in response operations in training exercises on maritime simulators. Although 40% of the respondents thought that volunteers should definitely be involved in the simulator trainings (Figure 3) with professional response crews and half of the respondents thought that volunteers should be included on some occasions (especially when particular functions can be foreseen for them), 40% of the respondents, mostly representing response/rescue organizations, evaluated the involving of volunteers either moderately suitable (10%), lowly suitable (20%) or not suitable at all (10%) (Figure 4).

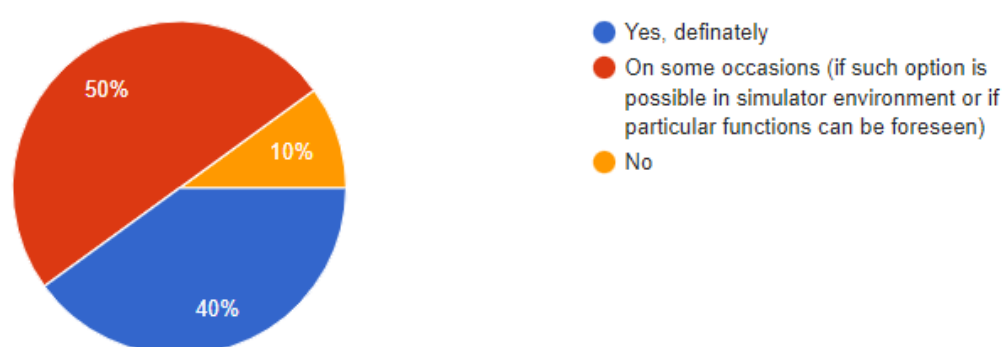


Figure 3. The necessity of involving volunteers (NGOs) in simulator training events together with professional crews.

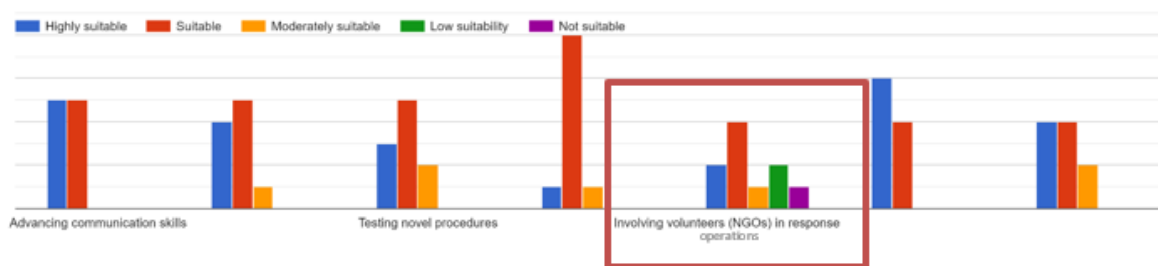


Figure 4. Suitability of involving volunteers (NGOs) in response operations

Maritime simulators aim to emulate the driving of an actual ship and imitate the real ship bridges build and function as closely as possible. Nevertheless, some aspects remain less realistic. The respondents were asked to evaluate the realism of different aspects of simulator exercises. 90% of the respondents strongly agreed or agreed that the communication can be considered realistic; 10% disagreed with that statement. The visual side was considered realistic by 80% of the respondents (10% strongly agreed and 70% agreed). 20% disagreed with the statement. Although, no explanation was provided on that matter, one could assume that there are difficulties in displaying the oil spillage or slick. 30% strongly agreed and 10% agreed that the technical side can be considered close to real-life situation, 40% were neutral and 20% disagreed. The difference could be due to the fact that respondents evaluated different aspects – either the physical appearance of the ships bridge, communication tools, etc. or the oil spill response equipment. The operational procedures of the oil spill related simulator exercises were either strongly agreed (40%) of agreed (40%) to be realistic, 10% were neutral and 10% disagreed. (Figure 5)

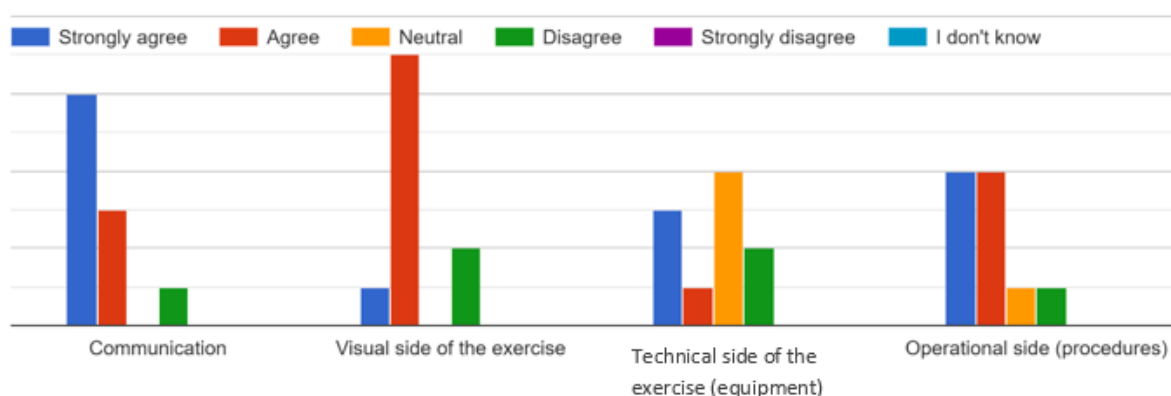


Figure 5. Evaluation on the realistic appearance of the simulator exercises.

Although, on a scale of 5, the efficiency of oil spill related simulator exercises was mostly considered average, 60% of the respondents think that the simulator exercises should be conducted once a year and 30% of the respondents think that on a more regular basis (i.e. quarterly) (Figure 6).

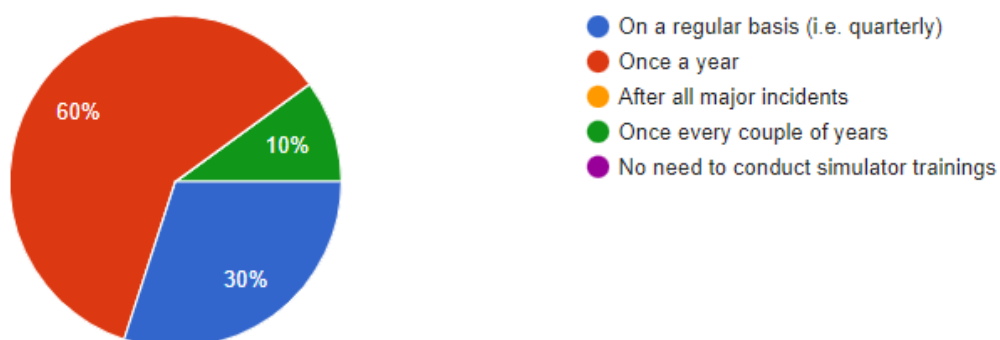


Figure 6. Regularity of conducting simulator trainings.

3. Roadmap for future oil spill training using maritime simulators

Experiences gained in the frame of the OIL SPILL project revealed that maritime simulators, although being a rather novel approach, are considered to be an essential part of the preparation process to tackle real oil spill accidents. Being considered as a complementary training method to tabletop and live exercises, it seems that simulated oil spill combating training could become a standard training procedure in the field of oil spill response in the nearest future.

To further promote the process, the organising of these events **should be carried on a regular basis** (at least once per year) along with the real planned exercises. For the simulator training to be an anticipated training event, the general structure and expectations need to be set carefully. The main focus of the simulator training should be tailored to practice/test specific operational procedures and skills before the field-exercises.

Based on the needs and expectations of the surveyed target groups within the OIL SPILL initiative following aspects should be considered for future oil spill training using maritime simulators either on national or international level:

- Definition of the **main target groups** to be approached in the exercise design phase;
- Setting a good training scenario with **realistic** and **clear objectives**, in accordance with valid environmental policies – recommendations and their legal implications, effective contingency plans, crisis management guidelines;
- Clarifying the **roles and responsibilities** of the participating units/target groups;
- Ensuring proper (IMO standardized) vessel-to-vessel and command centre-to vessel and/or shore personnel radio **communication**;
- Enabling **joint training** (either simultaneous or independent) of various parties involved in oil spill response operations, such as bridge and deck teams and shore personnel (including volunteers) in the same simulator training event;
- Further analysis and improvement of technological possibilities to **connecting maritime simulator centres** for the purpose of conducting real-feel simulated oil spill combating training with simulators connected in the same network (considering the experience of the European Maritime Simulators Network);
- Collecting **best practice examples and available experiences** as well as adaptation of **technical innovations** (methodologies, joint oil spill training models and training programmes, cost-efficient simulation environment) from the ongoing cooperation activities in the field of maritime simulators (the SIMREC Project, EMSN, etc.);
- Strengthening **cooperation** between existing simulator centres in the field of oil spill response.

With the rapid digital advancements and new cooperation initiatives, simulator exercises – and joint exercises between several centres – may become a standard in oil spill response training in the near future.

ANNEX 1. Simulator Training scenario for the OIL SPILL Simulator Training Event

The Simulator Training

General information about the exercise

In the frame of OIL SPILL project, TalTech Estonian Maritime Academy and Klaipėda university along with project partners will arrange an international simulator exercise on 14 October 2021.

The common language for the exercise will be English.

- Main aim of the exercise:

The main aim of the simulator exercise is to test the existing oil spill pollution response procedures (incl. the alarm procedure, cooperation between different response units, command processes in oil pollution incident) by involving multiple response units as well as shoreline response units (if seen necessary). Secondly, the aim is to train involved authorities and their units in coordination and cooperation during a national or multi-national marine pollution incident.

- Location of the exercise:
 - Description of area/special characteristics
 - Shallow near-shore area with some deeper areas near Vormsi Island
- Time of exercise (date + time): **TBA**
- Participants (organisations, people):
 - Authority in charge for the exercise: Estonian Maritime Academy
 - Head of response operations: JRCC Tallinn
 - Executive staff: representatives of Estonian Maritime Academy: 2-3 persons
 - Support: Klaipėda university
 - Other participating organisations/participants
- Technical resources
 - Bridges in Simulator Centre

TalTech Estonian Maritime Academy' Simulator Centre enables to take advantage of high-tech solutions in providing high-level maritime education and training. The centre incorporates four navigational bridge simulators with all aspects of a real ship-bridge. The bridges are fitted with navigational equipment and communication devices. Additionally, there is a possibility to use oil spill module in the simulator enabling the crews of response vessels, targeted participants of the simulator training event, to develop various skills like response vessel formations, manoeuvring and communication, as well as controlling oil booms, skimmers, buster and oil barges. Behavioural realism is aided by the spills' visual appearance, which depends on the amount of spilled oil and type of oil.

- Command Centre in Simulator Centre

Exercise agenda

Time	Topic/part of exercise	Room?	Presenter?
10 min	Registration and welcoming		
15 min	Introduction to Simulator Centre		
30 min	Introduction to exercise (what information is given? Exercise instructions given to participants Briefing		
2 hours	Simulator training	Sim. Centre	
45 minutes	Debriefing Conclusions		

Exercise scenario

At 0630EE JRCC Tallinn receives following info via VHF CH16: in low visibility a fishing trawler returning from the sea collided with a cargo ship. The fishing vessel didn't suffer any significant damage, but the cargo ship started to take in water (currently under control) and there was a break in two fuel bunkers resulting in an oil spill. Quantity of the spill is yet unknown, type HFO. Near the accident area is nature protected area. Distance to shore about 2,2 Nm.

Approximate coordinates of the collision: 59 10,2'N 023 25'E.

Weather: wind W 6 m/s, gusts up to 10 m/s, heavy rain at the time of the accident, later less or no rain.

ETA of the units should be far enough for the oil to reach the shore (or close to the shore). We'll fast forward this time in the simulator. I.e. In the beginning of the exercise, it is told that the accident took place 0630EE, closest unit ETA is 2h (which is quite realistic, even optimistic). And we start the simulation at 0815EE or something like that. The spilled quantity could be 3-5 tonnes?

Chain of events

JRCC Tallinn receives information from damaged cargo ship and starts response operation.

In course of the operation there is expected to be an information exchange between JRCC Tallinn, damaged cargo ship, response vessels and shoreline response resources.

ANNEX 2. Simulator Training Event Feedback Questionnaire

**to be conducted via Google Forms or other similar online applications*

Identification

☐ Bridge crew ☐ Response coordination team

Position/profession (open question)

I have participated in simulator exercises previously ☐ YES ☐ NO

Section 1 Organisational side

1. Please evaluate the event and the arrangement*

5=strongly agree 4=agree 3=neutral 2=disagree 1=strongly disagree

- a. Enough guidance and instructions were provided before the exercise (technical side)
- b. Briefing provided enough insight to the upcoming exercise
- c. Exercise duration was optimal
- d. I had sufficient instructions during the exercise (technical side)

2. Additional comments/feedback for the arrangement/organisational side (OPEN QUESTION)

Section 2 OIL SPILL Simulator Training Event on [date]

3. Evaluate the following aspects of the conducted simulator training:

5=strongly agree 4=agree 3=neutral 2=disagree 1=strongly disagree

- a. Exercise process was easy to follow
- b. Communication between ships/bridges was clear
- c. Communication between „response coordinator“ and „ships/bridges“ was clear
- d. The objectives of the exercise were completely met
- e. The *oil spill module* is considered useful in simulator training
- f. The exercise scenario was realistic/enabled the practising for oil spill response operation
- g. It was beneficial to conduct the exercise with international participants

- h. Debriefing was thorough, covered all the aspects of the exercise and emphasized lessons learned

4. Knowledge gained

5=strongly agree 4=agree 3=neutral 2=disagree 1=strongly disagree

- a. My individual skills and competence improved
- b. Regular simulator trainings would improve my individual skills and competence even more
- c. I can apply these skills in real life
- d. My organisations knowledgebase and cooperation skills improved

5. General feedback on the conducted simulator exercise

5 (=excellent) 4 (=very good) 3 (=good/sufficient) 2 (=fair) 1 (=poor/insufficient)

6. Additional comments /feedback on the conducted OIL SPILL Simulator Training Event (OPEN QUESTION)

- a. What was good?
- b. What needs development/improving?

Section 3 Simulator exercises for oil spill response training

7. Please evaluate the suitability of the simulator exercise in:

5=highly suitable 4=suitable 3=moderately suitable 2=low suitability 1=not suitable

- a. Advancing communication skills
- b. Practicing standard operation procedures
- c. Testing novel procedures
- d. Clarifying roles and responsibilities during response operation
- e. Involving volunteers (NGOs) in the response operation
- f. Enhancing cooperation with different parties involved in response operations
- g. Making the work of maritime response coordination centre more effective

8. Simulator exercises can be considered realistic (close to real-life situation)

5=strongly agree 4=agree 3=neutral 2=disagree 1=strongly disagree

- a. Communication
- b. Visual side of the exercise
- c. Technical side of the exercise (equipment)
- d. Operational side (procedures)

9. How do you evaluate the efficiency of oil spill related simulator trainings?

1=very efficient 2=efficient 3=neutral 4=somewhat efficient 5=not efficient

ANNEX 3. Online Questionnaire to gain insight from experts

- to be conducted via Google Forms or other similar online applications

Identification

Position/profession (open question)*

Organisation (open question)*

I have participated in simulator exercises previously ☐ YES ☐ NO

Your general knowledge about maritime simulators and training exercises:

- a. no knowledge
- b. minimal knowledge
- c. basic knowledge
- d. adequate knowledge
- e. superior knowledge

Simulator exercises for oil spill response training

1. What aspects of the simulator training You would consider as most valuable for your needs:
 - a. Ability to practise different scenarios in limited time and controlled environment
 - b. Cost efficiency (compared to live exercises)
 - c. Possibility to pause the exercise, give/get feedback and continue
 - d. Practicing cooperation in international setting

2. Should volunteers (NGOs) be involved in simulator training event together with professional crew?*
- a. Yes, definitely
 - b. No
 - c. On some occasions (if such option is possible in simulator environment or if particular functions can be foreseen for the volunteers)

3. How often it would be needed to conduct the simulator trainings?*
- a. On a regular basis (i.e. quarterly)
 - b. Once a year
 - c. After all major incidents
 - d. Once every couple of years

- e. No need to conduct simulator trainings

4. The scenario of the simulator exercise should be:*

- a. Made up for the specific exercise
- b. Tailored to practice one (or several) specific procedure(s)
- c. Based on real live-exercise (e.g Balex Delta)
- d. Based on a real accident
- e. Other. Please specify

5. Please evaluate the suitability of the simulator exercise in:*

5=highly suitable 4=suitable 3=moderately suitable 2=low suitability 1=not suitable

- h. Advancing communication skills
- i. Practicing standard operation procedures
- j. Testing novel procedures
- k. Clarifying roles and responsibilities during response operation
- l. Involving volunteers (NGOs) in the response operation
- m. Enhancing cooperation with different parties involved in response operations
- n. Making the work of maritime response coordination centre more effective

6. Simulator exercises can be considered realistic (close to real-life situation)

5=strongly agree 4=agree 3=neutral 2=disagree 1=strongly disagree

- a. Communication
- b. Visual side of the exercise
- c. Technical side of the exercise (equipment)
- d. Operational side (procedures)

7. How do you evaluate the efficiency of oil spill related simulator trainings?*

1=very efficient 2=efficient 3=neutral 4=somewhat efficient 5=not efficient 6=I don't know

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