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# Improving Preparedness for Shipborne Oil Pollution – Highlights of Tabletop Exercises at Saimaa Inland Waters

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ABSTRACT: Lake Saimaa is the largest lake in Finland and the Saimaa inland waterway network is one of the main transport corridors for merchant shipping. The Saimaa inland watercourse is a challenging operating environment due to shallow waters, narrowness of the fairways, fast currents as well as the sensitiveness of the environment. It is recognised that the heavy vessel traffic poses a risk of oil pollution. An oil spill incident in inland waters has a high potential for contaminating shorelines and affecting populated areas. Responding to such an incident involves several governmental and regional authorities, agencies and voluntary organisations. Inter-agency coordination is considered a key element in incident management. Several exercise types can be used to train multi-agency collaboration in joint response operations. This paper analyses the benefits of tabletop exercises in the strengthening of joint preparedness and contingency planning. Paper compares the outcomes of discussion-based exercises with operations-based drills and full-scale exercises. The analysis is based on four oil spill response tabletop exercises and five oil response drills conducted in Saimaa region in 2017–2018. Different types of exercises make it possible to focus on different aspects of the response operation. Operations-based exercises are useful in improving technical skills and testing procedures and the functioning of the equipment. Due to time restrictions, the equipment deployment drills usually focus on a specific function or a single task. Tabletop exercises can be used to assess contingency plans on a strategic level. Tabletop exercises offer an opportunity to clarify roles and responsibilities, discuss priorities and establish inter-agency agreements. The advantages of tabletop exercises include their flexibility in scenario-building, low-cost implementation and the possibility to study a longer time span in order to gain a more holistic view of the response operation.

## 1 INTRODUCTION

### 1.1 *Aim and scope*

The aim of this paper is to compare tabletop exercises to other types of exercises in improving the preparedness for shipborne oil spills. The paper discusses the benefits and limitations of tabletop exercises in the light of four executed exercises performed in the Lake Saimaa region during the past years. The analysis is supported with observations made during five field training exercises within the same time period.

### 1.2 *Background*

Responsibility in shipborne oil pollution response in Finland is divided between environmental and emergency services authorities. Since the beginning of the year 2019, the governmental agency the Finnish Border Guard is the competent pollution response

authority. In the event of a major shipborne oil spill, the Border Guard conducts the oil spill response measures on the open sea. The Regional Fire and Rescue Services (RFRS) are in charge of oil response operations both in coastal and inland waters. The Centres for Economic Development, Transport and the Environment (ELY Centres) approve the rescue authorities' contingency planning. The environmental officials of the ELY Centres also assist the RFRSs in executing the spill response operation by providing data for protection prioritisation. Along with the authorities, several non-governmental institutions as well as voluntary organisations are involved. For example, the Voluntary Oil Spill Recovery Troops of the WWF Finland are prepared to assist in responding to an oil spill contaminating shorelines.

As Lake Saimaa is an inland waterbody, the emergency response chain differs from the coastal arrangements. Saimaa Vessel Traffic Service (Saimaa VTS) is the responsible authority in coordinating distress communication in accordance with the Global Maritime Distress and Safety System. Distress call may also be made directly to the Emergency Response Centre by using GSM. From here on, the RFRS conducts the rescue operation while the contractual fire brigades and the Finnish Lifeboat Institution serve as reserves for personnel and equipment. The Police performs criminal investigation, if needed, and the emergency medical service takes charge of the injured people. The role of other authorities, such as municipal officers, depends on the situation. The emergency response chain on Lake Saimaa region is illustrated in Figure 1.

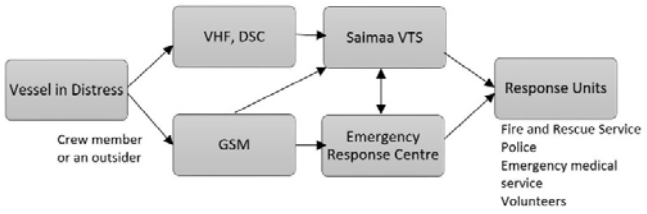


Figure 1. Emergency response chain on Lake Saimaa (Altarriba et al. 2018).

This paper focuses on the field of responsibility of the RFRSs and, particularly, on the recent capacity building actions carried out in four RFRS regions surrounding the Lake Saimaa. These actions include several exercise and training events, part of which the authors of this paper were able to participate in.

### 1.3 *Study structure*

This paper provides an overview of the oil spill response exercises used to improve preparedness for shipborne spills. First, the necessity of high oil spill response preparedness is described by presenting the main conclusions of an accidental risk assessment in relation to the sensitivity of the Lake Saimaa environment. Second, the types of exercises generally used to improve the response capability are introduced. Third, the benefits and limitations of each exercise type are discussed based on observations done during four tabletop exercises and five field training exercises. In the conclusions, the outcomes are summarized and some recommendations for future training are presented.

## 2 RISK FOR SHIPBORNE OIL SPILL IN SAIMAA INLAND WATERS

Lake Saimaa is the largest lake in Finland and the fourth largest lake system in Europe with surface area of approximately 4.400 square kilometers (Finland's Environmental Administration 2015). Lake Saimaa is connected to the Gulf of Finland and the Baltic Sea via Saimaa Canal and the Saimaa Deep Water Route for merchant shipping. The traffic density in the area is relatively high. In 2018, the number of vessel passages through Saimaa Canal exceeded 1.500, and the maritime transport of goods comprised 1,186 million tons of cargo (OSF 2019). Majority of the transported goods (91,4%) consisted of forest industry products for international trade (Finnish Transport Agency 2018) and in this role, the Saimaa waterways have developed into one of the main transport corridors in the trans-European transport network (TEN-T).

Lake Saimaa is a labyrinthine watercourse with narrow fairways and over 14.000 islands (Finland's Environmental Administration 2015). The confined and shallow waters, straits, narrow channels and tight turns combined with fast currents cause navigational challenges and limited mistake margins (Halonen & Kauppinen 2017). The total length of the Saimaa deep water route is about 760 kilometers, 255 kilometers of which (33,5%) is considered difficult to navigate (Halonen & Kauppinen 2017).

The Saimaa Canal restricts the maximum size of the vessels up to 82,5 meters in length (Finnish Transport Infrastructure Agency 2019). In addition to these Saimax-class cargo vessels, the traffic consists of passenger vessels, yachts and barges for timber floating, while the tanker traffic is prohibited due to the environmental sensitivity of the area. The risk of oil spill results from bunker fuel oils and lubricants. The potential outflow is estimated to vary from 20 to 30 cubic meters, as the vessels sailing in the area carry typically 40–50 cubic meters but up to 170 cubic meters bunker fuels (Heikkilä 2016; Halonen, Häkkinen & Kauppinen 2016; Halonen & Kauppinen 2017). Based on a risk assessment (See Halonen, Häkkinen & Kauppinen 2016), the probability of ship accidents in the Saimaa watercourse is relatively high. Incidents occur every year, the average annual accident frequency being five incidents. However, it is worth noting that yet so far no large scale shipborne oil spills have occurred, only small volume spills. (Halonen, Häkkinen & Kauppinen 2016.)

Lake Saimaa is a very sensitive environment preserved in its natural state in spite of significant forest industry and its water is used as both drinking water and process and condenser water for industrial plants. Several environmental protection areas and two national parks are situated in the region. Most importantly, the area is the habitat for many endangered species, the most significant being the critically endangered Saimaa ringed seal, *Pusa hispida saimensis*, and the Grayling, *Thymallus thymallus,* classified as near threatened species. (Toivola 2015; Rassi et al. 2010; Halonen & Kauppinen 2017).

The characteristics of the Saimaa inland waters, the narrow channels and canals, numerous islands and islets, as well as ice-coverage during wintertime affect the vessel traffic, but also complicate the spill response operations. Due to the close proximity of the shorelines, time for boom deployment to prevent oil washing ashore is very limited. Effective shoreline protection is further limited by fast currents. In case of an oil spill, the risk for shoreline contamination is very high. (Halonen & Kauppinen 2017.) As typical to inland waters, a potential oil spill is likely to affect populated areas and contaminate surface and groundwater water supplies (Owens et al. 1993; Halonen & Kauppinen 2017). An oil discharge, even small in volume, is therefore considered detrimental.

## 3 GETTING PREPARED THROUGH EXERCISING

Effective oil spill response requires competent personnel and functioning equipment. The optimal use of these resources is often described as procedures and guidelines in Oil Spill Response Contingency Plans. The most practical way to assess and test the feasibility of the planned procedures is to expose them to exercising. Different types of exercises make it possible to validate the different aspects of the response plan. An exercise programme should encompass all elements of the contingency plan and, by using various exercises as building blocks (See Figure 2), progressively prepare the personnel to master the whole scope of the operation. (IMO & IPIECA 2005; Halonen 2018.) Exercise programmes are incorporated into the statutory contingency plans and updated annually.

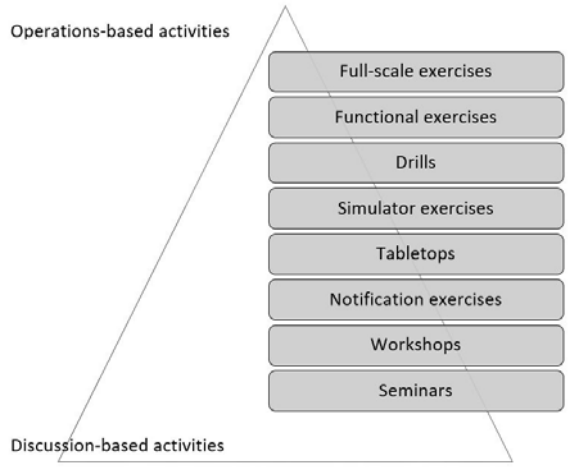


Figure 2. Progressive proceeding of exercise programme where discussion-based exercises precede operations-based activities. The higher stage in the pyramid, the more prior knowledge is required from the participants and the more pre-planning the exercise takes. (IPIECA & IOGP 2014; Halonen 2018)

Exercise types are generally divided into discussion-based exercises and operations-based exercises, where workshops and tabletops represent the former and drills and equipment deployment exercises the latter (Leonard & Roberson 1999; IPIECA & IOGP 2014). Exercising should proceed stepwise from simpler to more complex and from discussion-based to operations-based exercises as illustrated in Figure 2.

Operations-based exercises are useful in testing procedures and the functioning of the equipment. Discussion-based exercises can be used to assess contingency plans on a more strategic level as they offer possibilities to challenge response options and to gain mutual agreement on, for instance, response priorities. (Gleason 2003; IPIECA & IOGP 2014; Halonen 2018.) By using a wide range of exercises in terms of types, scales and difficulty levels, the contingency plan can be tested systematically. Thus, a comprehensive exercise programme helps to identify possible gaps in response resources or capabilities (Gleason 2003; IPIECA & IOGP 2014) – and keeps the training motivational.

### 3.1 *Drills and equipment deployment exercises*

Drills are exercises, in which personnel and response equipment are deployed and operated in a field environment (Leonard & Roberson 1999). Drills usually focus on a specific function or a single task (Halonen 2018) and are used to provide training on new equipment, validate procedures, and maintain or improve technical skills (Gleason 2003; IPIECA & IOGP 2014). Drills offer an opportunity to assess the functionality of the equipment and to find the most feasible response methods or techniques for specific operating environments. The greatest advantage of equipment deployment exercises is that they demonstrate the capabilities of the responders to employ the equipment as well as reveal the time the deployment takes (Leonard & Roberson 1999).

Figure 3. Northern Savonia Equipment Deployment Drill testing the most suitable boom model for under-ice boom-deployment (Halonen 2018).

### 3.2 *Tabletop exercises*

Tabletop exercises are defined as spill response management exercises without actual mobilization of personnel or equipment (Leonard & Roberson 1999; IMO & IPIECA 2005). An objective of a tabletop exercise is usually to develop a response plan to a specific incident based on a simulated scenario. The exercise scenario may remain constant, or when more complexity is added, the scenario advances as the exercise facilitators provide injects, such as event updates or situation reports in accordance with the pre-planned exercise script (IPIECA & IOGP 2014; Ha-lonen 2018). The exercise scenario is often build to

mimic an actual incident (Patrick & Barber 2001) and offers the participants an opportunity to clarify roles and responsibilities, discuss priorities and establish inter-agency agreements in a realistic, but non-stressful situation (Gleason 2003; IPIECA & IOGP 2014; Halonen 2018). This fosters cooperation and communication, and improves tactical response skills. Therefore tabletop exercises are considered useful in training multi-agency collaboration in joint response operations. Typical training objectives include incident command management, planning of response tactics and use of communication and situation awareness systems.


Figure 4. Tabletop exercise conducted in the Incident Management Center of Southern Savonia Rescue Service, and observers monitoring the progress of the situation (Halonen 2018).

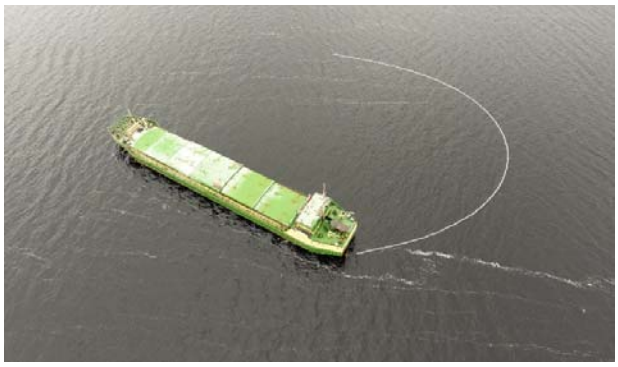

Figure 5. Exercise target vessel assisting in Arvinsalmi full-scale oil spill response exercise in North Karelia (Pitkäaho 2017).

### 3.3 *Full-scale exercises*

Full-scale exercises are exercises, in which resources, personnel and equipment, are mobilised and deployed to the full extent. The exercise scenario is simulated on the incident site and the operations are conducted as in actual emergency situations; in real time and, if applicable, with realistic delay times. This exercise type is very complex and resource-intensive as it involves many participants from different agencies and stakeholders. On the other hand, for that very reason, the full-scale exercise offers an opportunity to assess the availability and capabilities of maximum joint resources. Therefore it would be beneficial if all of the cooperation authorities and third parties who would normally be a part of such a response operation could be involved (IMO & IPIECA 2005), although this is often limited due to high expenses.

## 4 RECENT EXERCISES IN LAKE SAIMAA REGION

Regional authorities responsible for oil spill response actions in Lake Saimaa area accomplished a joint project developing an Inland Oil Spill Response Management Model last year. This project, called SÖKÖSaimaa (2016–2018), was coordinated by the Seafaring research and development team of the Logistics and Seafaring RDI department of the South-Eastern Finland University of Applied Sciences (Xamk). As part of the SÖKÖSaimaa project, the project consortium arranged four tabletop exercises and three field exercises. In addition, the rescue services conducted two full-scale exercises according to their confirmed exercise programme. The executed exercises together with their objectives are presented in Table 1. The exercises, nine in total[9], were held between May 2017 and October 2018.

Tabletop exercises were conducted in each rescue service region. The number of participants varied from 13 to 30 persons per exercise, total being 90 persons, majority of which were rescue service operative personnel. The role of the project team was to build the exercise scenario, design the script and facilitate the exercise as well as take care of the practical arrangements of the event. Planning process of each exercise took 16 to 32 working hours and one exercise session 4 to 6 hours on average.

The objectives of each tabletop exercise were set together with the responsible authority. The starting point of the exercise planning was to familiarize the operative personnel with the outcomes of the new Inland Oil Spill Response Management Model. In addition to this, the tabletops were meant to focus on themes the previous exercises had not covered. On this basis, the objectives were directed towards managing the middle and final phases of an oil spill response operation, as the initial response phase is frequently trained within the regular exercise programme. The exercise scenario of each tabletop exercise was built upon a shipborne oil spill, but the type of the accident, time, location, volume spilt and the environmental conditions at the spill site varied.

The tabletop exercises were conducted in the rescue service incident command centres and in two of them also an auditorium was used (due to numerous participants). All participants were provided with the means of communication and accesses to the situational awareness system (Baltic Oil spill Response Information System, BORIS 2.0) containing relevant information for the response planning, operational and sensitivity maps, logistical information and map-based tools for boom deployment planning and resource allocation. The exercise facilitators consisted of three project team members and one role player outside the exercise room supported by the officers on-duty from Saimaa Vessel Traffic Service, Finnpilot Pilotage and Finnish Transport Safety Agency. In two tabletop exercises, maritime authorities were also invited to join the Incident Command Management Team.

The exercises started with a briefing of the objectives and the background information of the

[9] Exercises within the project framework, the list is not inclusive.

initial situation, scheduled time and available tools. The tabletop participants were encouraged to ask questions and to indicate when ever issues arise that require more discussion. The nature of the event as a learning situation rather than an assessment of the performance of the individuals was highlighted. In order to validate the accuracy of the contingency plan, the participants were instructed to follow the procedures as truthfully as appropriate, for example actually making the necessary phone calls instead of just simulating them.

The actual exercise phase commenced with an emergency call from the vessel in distress. Following that, the participating authorities formed an Incident Command Management Team that controlled the response operation from the initial response phase to the closure of the operation.

Within each exercise, the scope of the actions covered all sections of the contingency plan with the emphasis on different temporal phases. The Southern Savonia tabletop exercise focused on the emergency phase and ensuring effective communication between rescue service, vessel traffic service and the vessel in distress. The North Karelia tabletop exercise was aimed to plan the reconnaissance surveys to assess the shoreline oiling conditions using SCAT procedures (Shoreline Cleanup and Assessment Technique) and initiate cleanup operations with relevant logistical support, while the Northern Savonia exercise concentrated on maintaining maintenance and provisions as the operation was expected to last several weeks. The aim of the South Karelia exercise was to familiarize some new personnel with the Incident Command (IC) Structure and IC procedures as well as new job aids developed in the SÖKÖSaimaa project. The tabletop exercise preceded the full-scale exercise where the IC procedures were implemented.

Rescue services in the Lake Saimaa region arrange at least one full-scale exercise in a year. The exercises are targeted at both management and operational level personnel, and the participants represent also other agencies and volunteers. Joint spill response performance was evaluated by means of Arvinsalmi Full-scale Exercise in September 2017. The exercise provided good results, and also demonstrated the minimum number of personnel needed in an IC team. This identification of resource needs offered valuable information to be specified in contingency plans and later used in tabletops.

Another collaboration exercise was arranged in the southern part of the region in October 2018. This South Karelian exercise focused on response activities in restricted visibility. The exercise scenario simulated a grounding of a light passenger vessel resulting in a spillage of light fuel oil, and later, the scenario advanced to a search and rescue (SAR) operation with casualties both onboard and overboard. Responding to this multimodal accident involved an air patrol squadron from the Finnish Border Guard, the Finnish Defence Forces, contractual fire brigades as well as the Voluntary Rescue Service Vapepa and the Finnish Lifeboat Institution with their voluntary search and rescue units. The actual training session took about three hours, while the preparations and demolitions took a whole day. The exercise planning was started in early 2018.

Table 1. Exercises conducted in Lake Saimaa area within the SÖKÖSaimaa project framework in years 2017-2018.

| Date | Name, type of exercise & objective |
|---|---|
| 8.5.2017 | Hammaslahti Reconnaissance Survey Drill in North Karelia<br>Testing applicability of different reconnaissance and surveillance techniques, including RPAS surveillance (Remotely Piloted Aircraft Systems), in determining the areal extent and the degree of contamination of oiled shorelines. |
| 19.10.2017 | Vuoksi Equipment Deployment Exercise in Fast Currents in South Karelia<br>Testng different types of booms and boom configurations suitable for oil containment in fast currents of Vuoksi River. |
| 20.9.2017 | Arvinsalmi Full-scale Exercise in North Karelia<br>Scenario: a collision between a cargo ship and a ferry resulting in an oil spill, no other injuries. Focus on an incident management and response actions including oil containment and recovery. |
| 6.3.2018 | Mikkeli Tabletop exercise in Southern Savonia<br>Tabletop exercise for multi-agency response. Participants: rescue service, environmental and maritime authorities including operative rescue service personnel.<br>Scenario: nighttime grounding of a cargo vessel resulting in an oil spill. Focus on communication and the initial actions in assessing the drift of oil in situation in which visual observations are not possible. |
| 10.4.2018 | Joensuu Tabletop exercise in North Karelia<br>Tabletop exercise for multi-agency response. Participants: rescue service, environmental and maritime authorities including operative rescue service personnel.<br>Scenario: onshore oil spill response operation as a continuation of the Arvinsalmi full-scale exercise (20.9). Focus on management actions in conducting SCAT and oil recovery operation management including clean-up procedures, logistics and waste disposal. |
| 11.4.2018 | Kuopio Tabletop exercise in Northern Savonia<br>Tabletop exercise for regional authorities including the operative personnel. Scenario: a grounding of a cargo vessel resulting in a leakage in her engine room. Focus on multi-agency communication between rescue service and maritime authorities in managing salvage and spill response operation. |
| 12.4.2018 | Kuopio Equipment Deployment Exercise in Ice Conditions in Northern Savonia<br>Drill to test oil spill response tactics in ice conditions. Training ice-slotting, the use of booms and skimmers. |
| 3.5.2018 | Joutseno Tabletop exercise in South Karelia<br>Tabletop exercise for rescue service, maritime and environmental authorities.<br>Scenario: a vessel collision in an industrial harbour resulting in an oil spill, no other injuries. Focus on oil spill response tactics, oil containment and recovery, as well as logistical support. |
| 10.10.2018 | Lappeenranta Full-scale exercise in South Karelia Joint exercise based on a scenario of a grounding of a passenger ship resulting in several casualties on board and overboard, as well as an oil spillage. Focus on managing simultaneous search and rescue operation and oil spill response operation. |

## 5 DISCUSSION ON LESSONS LEARNT

Frequently oil spill response training focuses on the initial phase of the response operation, such as alert and notification procedures, oil containment booming and other straightforward response countermeasures, whereas maintaining the long-term process of the operation is paid scant attention to (Gleason 2003; Leonard et al. 2014; Narin van Court & Robinson 2014). This is mainly driven by economical reasons. Training is resource-intensive and costly as it need to be arranged during extra working hours of the personnel in order to maintain adequate readiness to actual emergencies. Restricted amount of time forces setting the goal to the first critical response tasks. Gleason (2003) suggests that the narrow scope of training objectives is partly linked to increased operational demands of authorities as well as the personnel turnover requiring repetition. Based on the authors experience, the tabletop exercise format proved its usefulness in meeting these challenges. Careful design of the exercise script makes it possible to study a longer time span in order to gain a holistic view of the response operation. By manipulating time, different elements of the response operation - alerting and notification, resource identification, protection prioritisation, oil containment booming, oil recovery, shoreline protection and clean-up, oil waste logistics, waste disposal, wildlife issues, human resources, communication, claims management, maintenance, decontamination etc. can be covered in a relatively short period of time and thus with minimal disruption to daily operations. The feedback confirmed that setting the focus beyond the crisis phase of the incident to the later phases of the operation was beneficial, gave wider perspective on spill response issues and clarified many questions the participants have had.

It was also noted that, though the systematical establishment of the objectives would allow all elements of the contingency plan to be dealt with, it requires a progressive approach. In addition, the focus must be limited to the oil spill response excluding competitive goals. When planning the exercises, a following guideline was kept in mind: "two or three primary objectives are better than a long list of secondary objectives" as defined by both IMO & IPIECA (2005) and IPIECA & IOGP (2014). Also Patrick & Barber (2001) underline that a tabletop exercise should focus on one key objective and one or two sub-objectives at a time. However, distraction due to "competitive" objectives was detectable during the Northern Savonia tabletop exercise, where the salvage of the vessel itself rose to a central role and controlling the oil spillage would have been overlooked without the facilitators' intervention. The authors assume that this was contributed by the fact that the participants were more acquainted with salvage routines than spill response operation. Thus, the attention tended to focus on more familiar tasks. Distraction was even more evident in the South Karelia Full-scale Exercise, during which the management of SAR operations ran over other tasks while the spill response countermeasures were almost neglected by the IC. This proved that, since saving human lives is the first priority, it is advisable not to incorporate rescue tasks to exercises with environmental protection goals if the time allocated does not allow staggering of the objectives. With several simultaneous objectives, the common operating picture seemed to be lacking and, as far the authors observed, it managed to not form within the given exercise time.

One of the greatest advantages of the tabletop exercises, which was also confirmed by participant feedback, was the opportunity to strengthen collaboration. Tabletops provided non-stressful situations to clarify inter-agency roles and responsibilities in contingency planning and in joint operations. The participants stated that especially the involvement of the maritime authorities, pilots, safety inspectors and VTS operators, alongside the environmental specialists of ELY Centres, contributed to a better understanding of the incident management as the authorities have usually had separate exercises of their own. Discussions helped to share experiences and to gain regional agreements on i.e. response priorities.

On the other hand, the discussions-based nature of the tabletops is also recognised to be its potential weakness. Failures in setting appropriate objectives can easily lead to ineffective exercise facilitation i.e. too broad nature of the tabletop discussions (Leonard & Roberson 1999; IPIECA & IOGP 2014). Vague discussions do not provide tangible results or measurable improvements, nor provide any learning value (Leonard & Roberson 1999). Unlimited possibilities in conducting tabletop exercises can therefore be two-faced; the scenario-building needs balancing between pre-planning and improvisation. Exercise manuscripts should include a master list of events or injects and their expected timeline, but leave room for the chain of events the participants themselves will set off. Pre-scripted injects help to ensure that the exercise advances but remains within the designed parameters. The main task of the facilitators is to ensure that the discussions are focused and the objectives of the exercise will be fulfilled. Autonomous-driven scenarios will lead to dead-end or on the sidelines from the exercise goals.

It was recognised that the effortlessness of the response actions within tabletop exercise may create assumptions that may not be grounded on reality. For example, the true deployment times of the equipment are easily obscured as the exercise format allows vast resources to be deployed in seconds. Therefore realistic delay and response times based on field exercise results, should always be brought out. It is also essential to not just base the estimates on resource availability on written lists in contingency plans, but to verify them by actually contacting the resource providers. In three tabletop exercises out of four, the participants found outdated information in their contingency plans and they were mostly related to the available resources and contact lists. Updated information saves time in actual emergencies and contributes also to other activities, not just oil spill response issues.

Arrangements for tabletops and simulating the exercise scenario can be carried out with a few facilitators. The actual exercise can be executed with a relatively small group of key personnel, however the number of the participants can be easily increased in order to achieve the benefits of a mutual planning

process. Moreover, not every participant needs to be situated in the same place, as many of the roles can be played via phone. Furthermore, not all agencies need a prior notice. This gives a lot of flexibility for the exercise design and arrangements. The low-cost implementation of tabletop exercises allows them to be organised frequently, even for smaller groups at a time. In that case, it is essential to share results wider to increase the number of beneficiaries of the exercise.

Table 2. Elements of the oil spill response preparedness and the observed areas of improvement the different types of exercises contributed the most.

| Objective | Tabletop Exercise | Drill | Full-scale Exercise |
|---|---|---|---|
| Notifications | X | X* | X |
| Resource identification | X | X | X |
| Resource availability | X* | X* | X |
| Verifying competencies/gaps | | X | X |
| Responsibilities & roles | X | | X |
| Validating contingency plans | X | | X |
| Inter-agency collaboration | X | | X |
| Communication | X | X* | X |
| Surveillance & forecasting | X* | X* | X* |
| Protection prioritisation | X | | X |
| Response tactics & strategies | X | | X |
| Response measures & techniques | | X | X |
| Mobilization times & procedures | | X | X |
| Deployment times & procedures | | X | X |
| Equipment functionality | | X | X |
| Shoreline treatment | | X | X |
| Logistical support | X* | X* | X |
| Local conditions | | X | X |
| Equipment maintenance | X* | X | X |
| Managing waste disposal | X* | X* | X* |
| Long-term operations | X* | | |
| Financial management & claims | X* | | |

* If targeted at that specific objective

## 6 CONCLUSIONS

The objective of this paper was to discuss the benefits and limitations of tabletop exercises in improving preparedness for shipborne oil pollution compared to other exercise formats. The comparison originated from the experiences in facilitating four tabletop exercises and two drills as well as participating in three field exercises in the Lake Saimaa region during the past years.

Discussion-based tabletop exercises proved their usefulness in assessing the contingency plans on a strategic level. The tabletop exercises contributed to the clarification of the roles and responsibilities and gave possibilities to discuss priorities and establish inter-agency agreements. The advantages of tabletop exercises included their flexibility in scenario-building, low-cost implementation and the possibility to study a longer time span in order to gain a more holistic view of the response operation. However, tabletops cannot replace the operations-based training – both formats have a role in ensuring proper oil spill response preparedness (See Table 2). Field exercises are needed in order to validate realistic response times, the functioning of the equipment as well as to improve the skills of the responders. Tabletops should be based on these tested parameters, otherwise there is a risk of unrealistic assumptions in contingency planning rebounding upon actual emergencies. With goal-oriented facilitation, tabletop exercises offer an effective way to test and validate spill response strategies. In particular, tabletops are useful in training long-term, multi-agency operations. Based on the authors experiences, as the oil spill response operations are not as familiar as other rescue operations, it is recommended to conduct oil spill response exercises separately and not to add other objectives until the participants are trained enough or the number of persons in the IC team is adequate to handle multisectoral operation.

In order to enhance the learning outcomes of future exercises, the contents of tabletop exercises are recommended to be extended to cover also cost accounting and claims management. In addition, the facilitators should find more ways to document the participants' activities, to collect and analyse data in order to conclude the exercise, and to share findings and recommendations even more effectively.

## ACKNOWLEDGMENTS

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