EMSA | OIL SPILL SAMPLING SCENARIOS

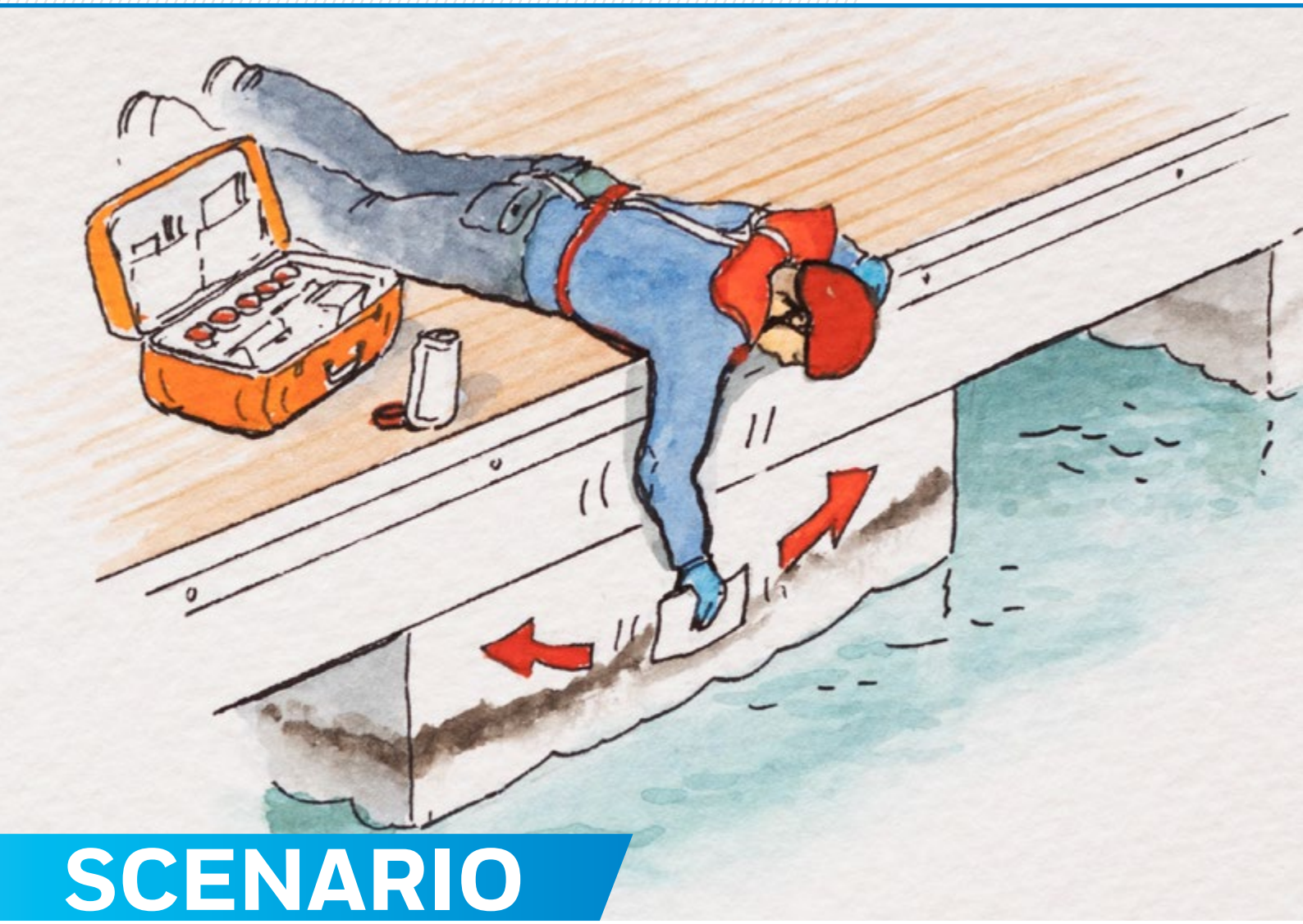
Developed under the CTG MPPR

OIL SPILL SAMPLING SCENARIOS

INTERDISCIPLINARY PRACTICAL GUIDELINES ON OIL SPILL SAMPLING IN EUROPE

Developed by experts from EU/EFTA countries under the framework of EMSA's Consultative Technical Group for Marine Pollution Preparedness and Response (CTG MPPR)

A special mention to Mr Juan Carlos Arbex Sánchez for the technical drawings



SCENARIO SAMPLING IN HARBOURS

IMPORTANT NOTE

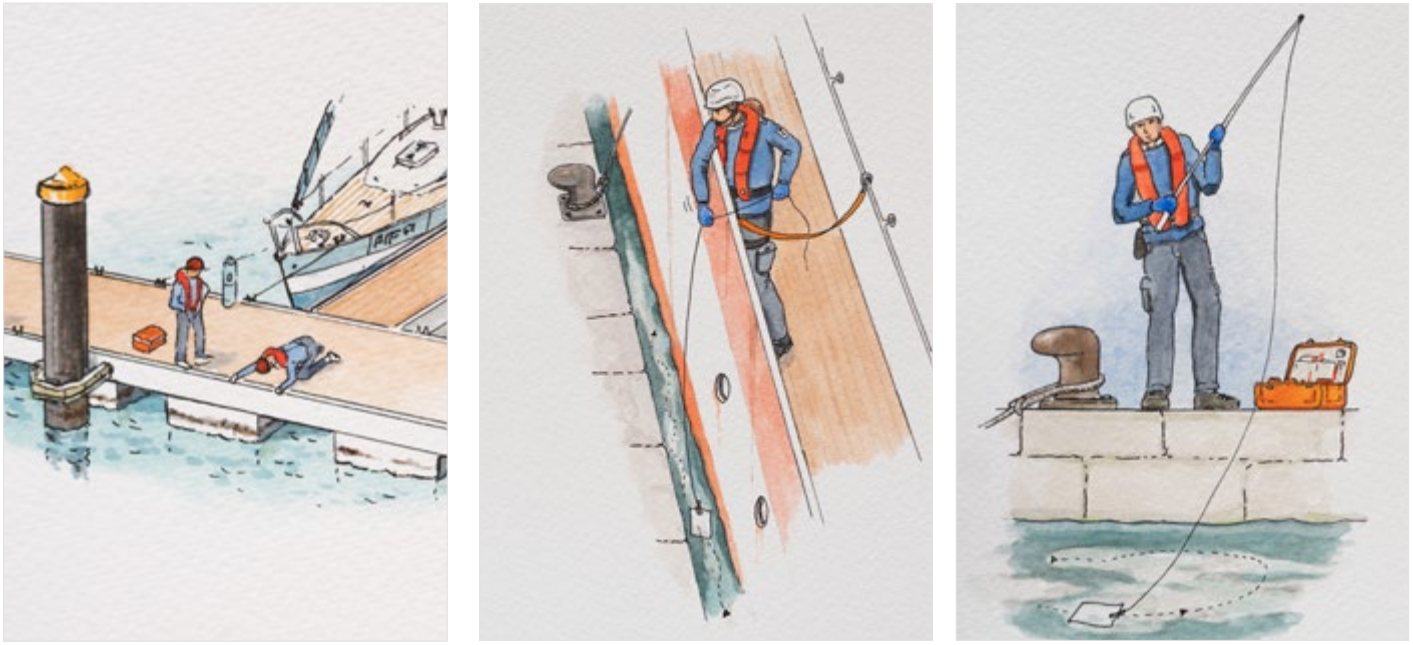
These scenarios are intended as a practical manual in the field. Please be sure to have familiarised yourself beforehand with the main text of the EMSA document "Interdisciplinary practical guidelines on oil spill sampling in Europe".

DEFINITION OF THE SCENARIO

Sampling in harbours includes the sampling of oil from surface water in harbours and the sampling of oil on the harbour's infrastructure, like quays, piers and landing stages. For sampling on-board ships in harbours see the scenario "Sampling on-board ships".

When dealing with oil spills in harbours, sample takers should pay special attention to the following issues:

- Surface waters in harbours may contain traces of various petroleum products. There is a risk for fresh oil spills to be mixed or contaminated with (remains of) other spills. This makes the timely collection of background samples / field blanks essential.
- When a spill in a harbour is a result of bunkering, there can be several ships that have received the same bunker oil. However, the remaining oil in the fuel tank of each ship will mix with the new bunkers and will cause small compositional differences. Often these small differences can be significant in the identification or confirmation of the source of the spill.



Example of locations to be sampled

SAMPLING PURPOSES

Several purposes for sampling might be intended, these include:

- Characterisation of the oil and/or identifying the type of oil.
- Determination of the homogeneity of an oil spill.
- Determination of the degree of weathering of an oil spill.
- Determination of the source(s) of an oil spill.
- Providing evidence in criminal proceedings through the comparison of spill samples with samples of possible sources.

SAMPLING STRATEGIES

The sampling strategy for a case that is comparable with the given example could be:

- Decide on a sampling strategy before sampling starts. If necessary, coordinate your actions with other involved parties and other sampling strategies being used in the operation or at other sampling sites.
- Organise the sampling procedure so it progresses from the least contaminated to the most contaminated location to avoid cross contamination.
- Locate all possibly related geographically distinctive spill locations during all the days that the spill continues and include them in the sampling plan.
- Look for clues that can be an indication of the source of the spill. If potential sources are identified include them in sampling. Try to obtain samples of all potential sources for comparison with spill samples.
- Focus sampling on the areas of undisturbed, thick layers of oil (where possible).
- Also take samples from locations where the spill has a different visual oil appearance in colour or thickness of the layer, indicating e.g., different viscosity etc.
- Take representative samples of all geographically distinct spill locations during all the days that the spill continues.
- When a distinct spill site is large, take representative samples with maximum spatial difference covering the whole area.
- Take background samples during all the days that the spill continues or as appropriate.
- If a spill continues over a very long period (e.g. months), longer intervals between sampling might be appropriate in the latter stages of a spill.

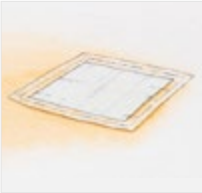
IMPORTANT NOTE

✓ **IT IS ADVISABLE TO TAKE MORE SAMPLES TO BE ON THE SAFE SIDE.**

✓ **REMEMBER! THERE IS NO SECOND CHANCE FOR SAMPLING.**

SAMPLING PLAN

SAMPLING EQUIPMENT

	Nitrile gloves		ETFE net
	Polyethylene cornet or conical PTFE bag		Clean bucket
	Stainless steel spatula, stainless steel scraper or PTFE scraper		Sampling pole (stainless steel or PTFE)
	Glass bottles with inert lining in the lid		Sampling documentation and seals
	Transport container (insulated and cooled, if needed)		If available: camera for photo/video

OVERVIEW OF POSSIBLE SAMPLING PROCEDURES TO USE IN THIS SCENARIO:

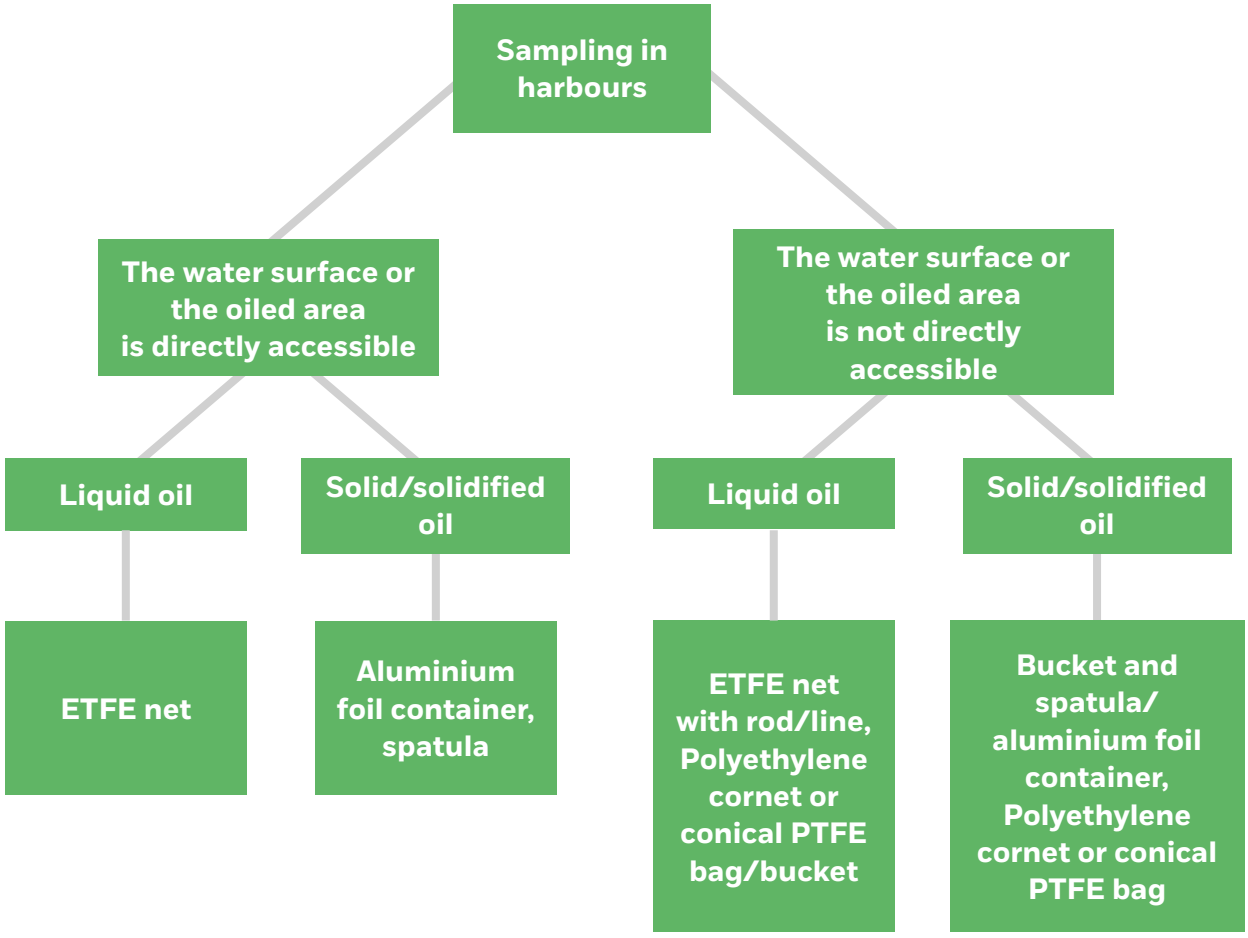
Depending on the oil type to be sampled and the extent of the spill, the following techniques should be used[1]:

Liquid oil [2](including sheens):

- Sampling by ETFE net, if needed with additional equipment (e.g. sampling rod/line, sampling pole, bucket).

Solid / solidified oil (emulsified oil ("mouse"), tar balls, and compact material in general):

- Sampling by aluminium foil containers or bucket or spatula, or polyethylene cornet.



[1] Direct sampling with a glass bottle should be the last resort in the absence of other options since this sampling technique leads to increased risks of (cross) contamination while yielding samples of lesser quality.

[2] The term "liquid oil" describes all types of oil that are fluid enough to attach to the ETFE net, unrelated to the specific oil type

HOW AND WHERE TO SAMPLE (POSITION AND TECHNIQUE)

ETFE net

Sweep the oil layer on the water surface with the ETFE net to collect oil. The net can also be dipped several times into the oily water. Store the ETFE net in the glass bottle with an inert lining in the lid.

Prevent parts of the net becoming trapped between the mouth of the bottle and the lid, to avoid leaking. Note that, when dropped on the water, the ETFE net might sink.

The net can be connected to a fishing rod or to another rod with stainless steel clips for easy access to the spilled oil or for expanding the range for sample taking.

Do not fill up the glass bottle with water after storing the ETFE net in it.

HOW AND WHERE TO SAMPLE (POSITION AND TECHNIQUE) CONT.

Clean bucket / Aluminium foil container

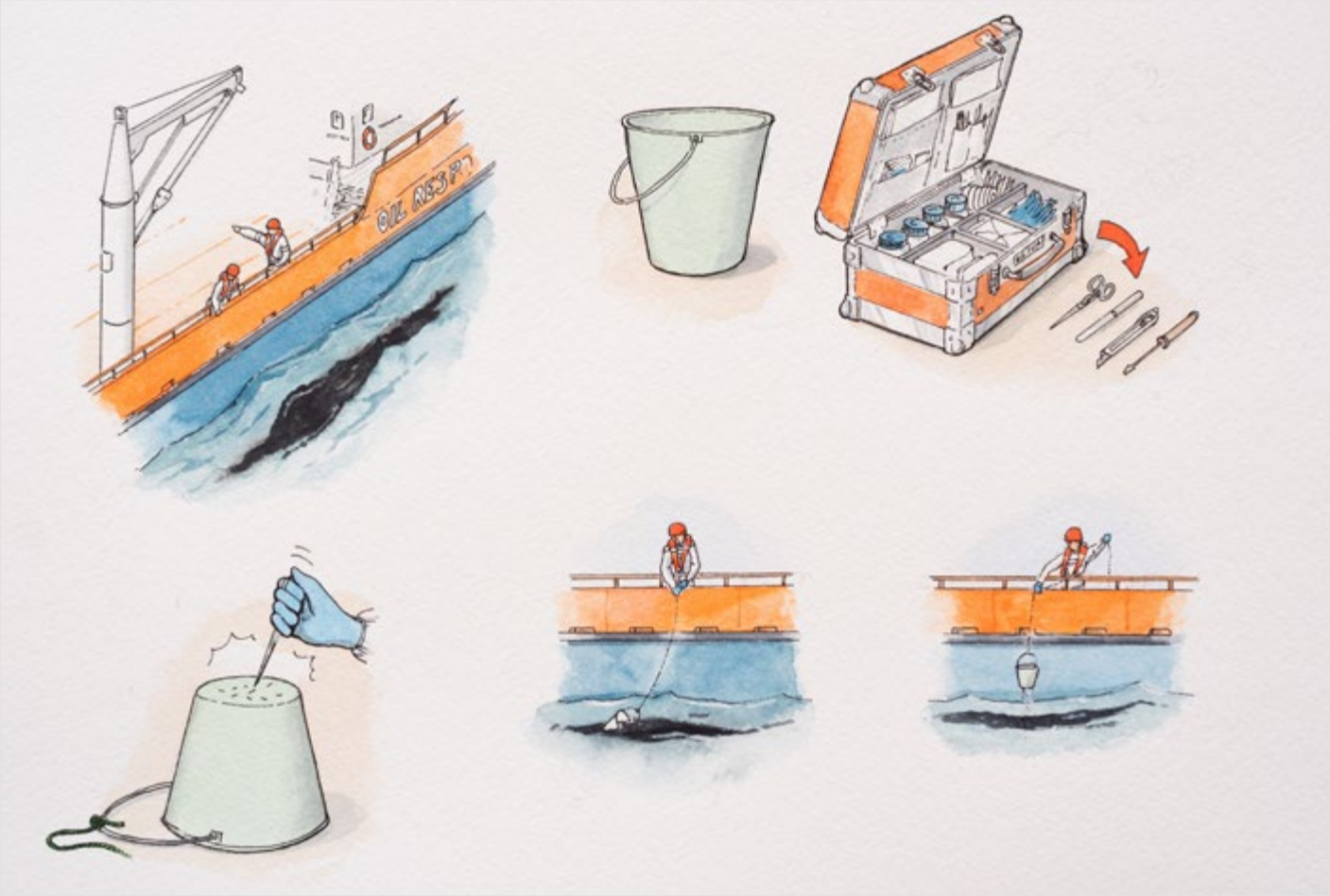
Sweep the bucket/aluminium foil container through the oil layer on the water surface to collect oil. When tar balls are present, sweep the device through the water to collect these tar balls.

Remove the water from the bucket (e.g. by previously perforating the bucket or the bottom of the aluminium foil container and after sampling letting the water escape through the holes). If necessary, repeat the same procedure several times, to increase the amount of oil in the bucket/ aluminium foil container. (Note: The same bucket can be re-used only at the same spot and at the same time). Transfer the oil to a glass bottle with an inert lining in the lid; additionally, a stainless-steel spatula or an ETFE net (wear gloves!) can be used to scrape the sides of the bucket/aluminium foil container.

Alternatively, a bucket without holes can be used to sample a water-oil-mixture from which the oil is subsequently collected by a hand-held ETFE net (use gloves!).

Collect a layer of at least a centimetre of dewatered oil in the bottle.

Do not fill the bottle with oil to more than 2cm below the lower edge of the lid. Do not fill up the bottle with water!



HOW AND WHERE TO SAMPLE (POSITION AND TECHNIQUE) CONT.

Polyethylene cornet or conical PTFE bag

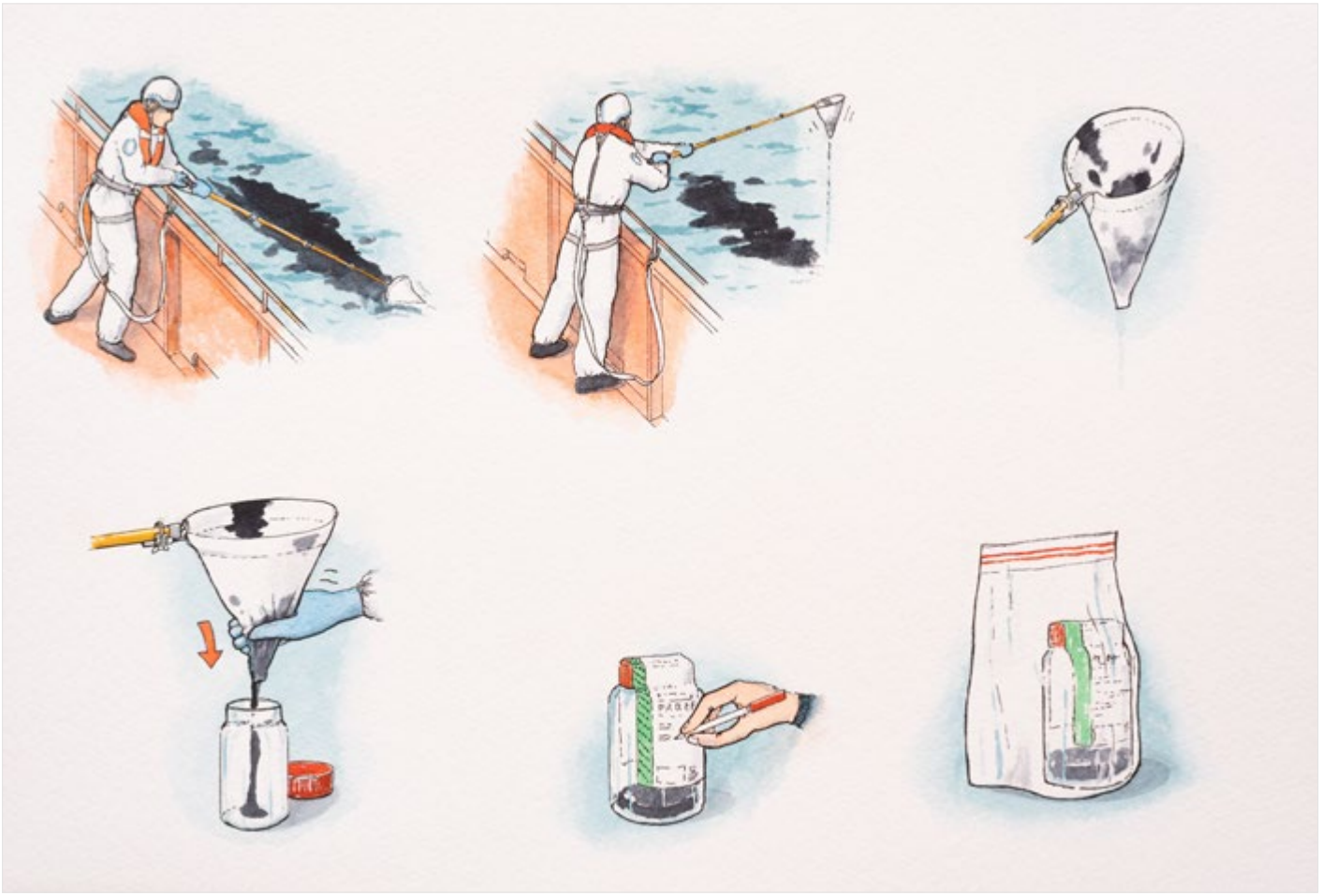
Attach the cornet to its holder. Sweep the cornet or conical bag through the oil layer on the water surface to collect oil. When tar balls are present, sweep the device through the water to collect them.

Remove the water from the sample device by letting the water escape through the hole in the bottom. Transfer the oil, through the hole in the bottom, to a glass bottle with an inert lining in the lid.

Repeat the same procedure several times to collect a layer of at least a centimetre of dewatered oil in the bottle.

Do not fill the bottle with oil to more than 2cm below the lower edge of the lid. Do not fill up the bottle with water!

A stainless steel clip can be used to temporarily block the hole in the bottom of the conical bag, when necessary.



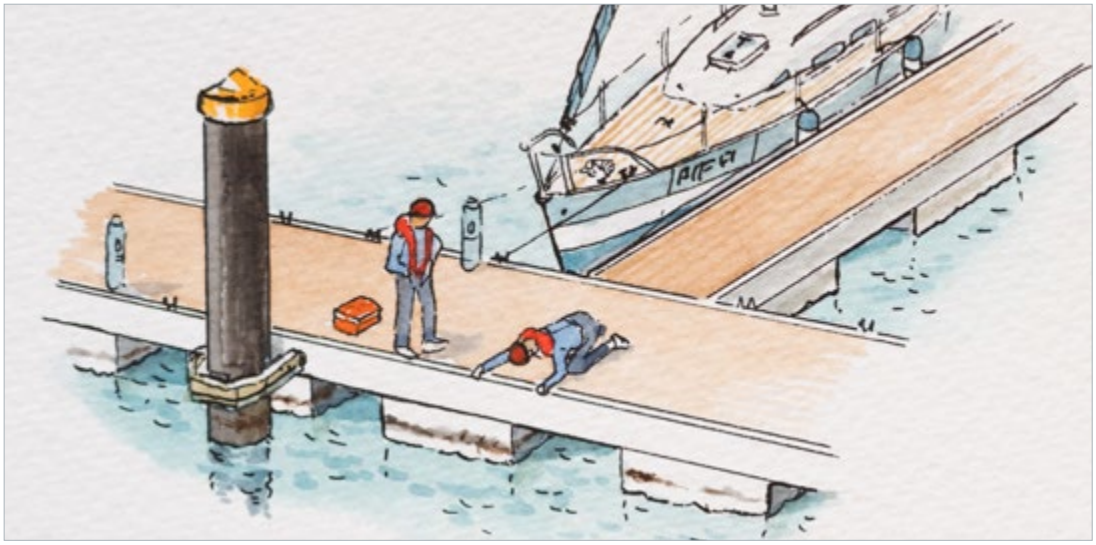
HOW AND WHERE TO SAMPLE (POSITION AND TECHNIQUE) CONT.

Stainless steel spatula, stainless steel scraper or PTFE scraper

Use a stainless steel spatula or alternative to scrape thick oil layers from hard substrates like quays, rocks etc. Transfer the oil or the spatula with the oil to a glass bottle with an inert lining in the lid. Make sure not to scrape off material from the surface underlying the oil.

In case of doubt a background sample can be collected from a section of the substrate that is obviously free from oil.

Use a stainless steel spatula directly to collect tar balls and other compact material into a glass bottle with an inert lining in the lid.



KEYPOINTS FOR GOOD SAMPLING PRACTICE

For all optional sample procedures, the practical basic principles of forensic oil sampling apply

1. Personal safety - explosion or fire: Consider whether there is a risk of explosion or fire. High risk can be expected with fresh spills of crude oil and light fuel oils (lighter than diesel). Whenever there is high risk of explosion or fire due to the presence of highly volatile compounds, additional regulations apply.
2. Personal safety – toxic fumes: Oil spills can produce toxic fumes; use a suitable respiratory protection. Whenever possible approach the spilled oil from the wind direction limiting personal exposure.
3. Use disposable nitrile gloves for sampling. Change gloves for every new sample.
4. When using an ETFE net, put gloves on only directly before you touch the clean ETFE net and make sure to not touch anything else with the gloves to avoid contaminating the ETFE net.
5. While taking samples always work from the least contaminated to the most highly contaminated location to avoid cross contamination.
6. Required sample amount depends on sampling purpose (analyses for physical parameters - hundreds of millilitres up to litres; oil for forensic analyses – a few millilitres).
7. No spill is too small to be sampled. Even if you don't see oil on the ETFE net, it can be enough for analysis.
8. Always try to minimise the handling of the sample as much as possible to make sure that your handling of samples and equipment does not contaminate the samples. Look out for lids not to be contaminated during sampling and not to switch lids between samples.
9. Take care to not switch samples, label each sample at once after taking it.

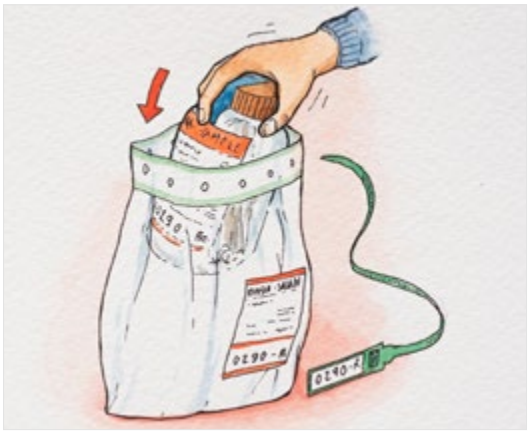
WHAT TO DO AFTER SAMPLING IS COMPLETED (SEAL, LABEL, TRANSPORT)

Sample documentation and labelling

- Carefully label all samples and fill in the required documents to maintain the chain of custody during transport and for the request for analysis.
- Check whether sampling has been properly completed according to the field checklist of table 1 of chapter 4 (main document: Interdisciplinary practical guidelines on oil spill sampling in Europe).
- At all times keep documents like the analysis request form and the chain of custody form together with the samples.

WHAT TO DO AFTER SAMPLING IS COMPLETED (SEAL, LABEL, TRANSPORT) (CONT.)

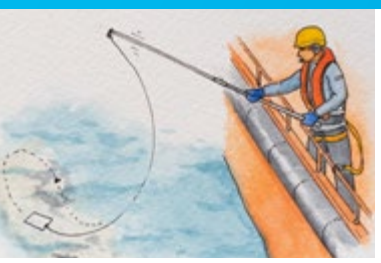
Transportation

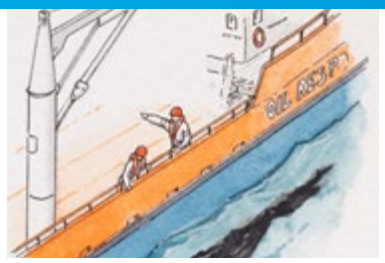


- Seal sample bottles and when appropriate, the transport box.
- Inform the laboratory ahead of delivery to prepare the controlled reception of samples.
- Transport samples to the laboratory directly after sampling. Keep samples in the dark and cooled (4°C) during transport.
- Make sure that the chain of custody is maintained by every responsible handler of the samples by ensuring the chain-of-custody forms are completed and signed.
- If you can, use a temperature logger in the transport box or cooler to prove proper transport conditions.
- Ensure that sample bottles are shatter-proof and are packed properly. If samples contain liquids, use absorbing material in the package to reduce the effects of leakage.
- Follow applicable regulations regarding the shipping of oil-containing samples.

DON'T FORGET

- ✓ USE CLEAN NEW NITRILE GLOVES AND CLEAN TOOLS FOR EVERY SAMPLE.
- ✓ COLLECT SAMPLES IN ORDER FROM THE LEAST CONTAMINATED TO THE MOST HIGHLY CONTAMINATED LOCATION TO AVOID CROSS CONTAMINATION.
- ✓ FOCUS SAMPLING ON THE AREAS OF UNDISTURBED, THICK LAYERS OF OIL. IN HARBOURS, REMAINS OF PREVIOUS SPILLS ARE A REAL RISK TO CONTAMINATE FRESH SPILLS.
- ✓ COLLECT BACKGROUND SAMPLES.
- ✓ REMEMBER THAT THERE IS NO SECOND CHANCE FOR SAMPLING.
- ✓ IF IN DOUBT ABOUT DETAILS OF THE PROCEDURE, CHECK BACK TO THE MAIN TEXT OF THE OIL SPILL SAMPLING GUIDELINES.






ABOUT THE EUROPEAN MARITIME SAFETY AGENCY

The European Maritime Safety Agency is one of the European Union's decentralised agencies. Based in Lisbon, the Agency's mission is to ensure a high level of maritime safety, maritime security, prevention of and response to pollution from ships, as well as response to marine pollution from oil and gas installations. The overall purpose is to promote a safe, clean and economically viable maritime sector in the EU.

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