Manual Offshore Recovery

A manual for the use of the offshore recovery unit for binders
Acknowledgement

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Disclaimer
This User Manual has been developed as a Manual for the handling of gear to recover floating sorbents from the water surface after an oil spill. It describes the different steps that have to be taken into account to ensure a safe, fast and efficient operation in case of an emergency. It is necessary to deal with the equipment and to learn the operation procedures in advance through exercises. Although every effort has been made to produce a complete manual, no responsibility can be taken to ensure that this Manual covers all situations when in use.

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Foreword

This manual is designed for the user of the offshore recovery unit in case of sorbent application at sea.

The aim of this manual is the safe and correct use of the gear while using sorbents to respond to a marine oil spill.

This manual describes the handling of the gear to recover floating sorbents from the water surface.

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- Sorbent collection (Step 3) (p. 19)
- Sorbent discharge (Step 4) (p. 20 – 35)
- Decontamination (p. 36)
- Netboom recovery (Step 5) (p. 37 – 45)
Proposed set-up of the Offshore-Recovery

- Towing vessel 1
- Towing vessel 2
- Movement direction
- Binder area
- Side arm
- Trawlnet + Codend
If good operational procedures are followed and correct Personal Protective Equipment (PPE) is worn, operations should pose minimum risk to health. However there are, as with other such activities, potential risks to all participants.

These risks can be minimised by:

- Conducting a comprehensive risk assessment process and implementing mitigation measures to reduce them where applicable
- Communicating the risks and mitigations in place through a safety brief prior to any operations being carried out.

Minimum PPE standards:

- Ear lugs/ muffs whilst machinery is running
- Gloves
- Safety shoes
- High visibility clothing
- Life-Jacket
- Coveralls
# Risks and mitigations

<table>
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<tr>
<th>Risks</th>
<th>Impacts</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man overboard.</td>
<td>Potentially leading to hypothermia, drowning.</td>
<td>When working on the back deck personal flotation devices to be worn. Any open access to be secure.</td>
</tr>
<tr>
<td>Unsecured load. Lashing/welding equipment to the deck.</td>
<td>Potential crush injuries from unsecure loads.</td>
<td>Welding to be carried out by a competent and trained person. Equipment to be secured to the deck properly and checked by person nominated Deck In Command (IC) prior to vessel steaming.</td>
</tr>
<tr>
<td>Exposure to Volatile Organic Compounds (VOCs) and potentially also Hydrogen Sulphide H₂S from the oil that has been spilt.</td>
<td>Could cause nausea and if H₂S is present, death in extreme cases.</td>
<td>Enforce a site entry protocol. Provide gas monitoring devices and appropriate respiratory PPE.</td>
</tr>
<tr>
<td>Manual handling.</td>
<td>Potential for back injuries.</td>
<td>Before any deployment commences, manual handling training should be given to anyone involved. Ensure that weights are clearly marked on the packages. Make sure that lifting equipment is available as appropriate.</td>
</tr>
<tr>
<td>Slips, trips and falls.</td>
<td>Potential for minor injuries such as cuts, bruises or minor fractures.</td>
<td>Appropriate footwear to be worn. Handrails to be used. There should be an awareness of the sea conditions. Good housekeeping will also minimise the incidences of slips, trips and falls.</td>
</tr>
<tr>
<td>Noise (85-90dBA).</td>
<td>Danger of damage to hearing if exposed to loud machinery for prolonged periods of time.</td>
<td>Ear defenders to be provided and worn.</td>
</tr>
</tbody>
</table>

According to Field Guides from Oil Spill Response Limited (OSRL)

While this table lists some of the common hazards that are likely to be present when conducting offshore containment and recovery operations, it does not constitute a risk assessment. A full site-specific risk assessment should always be conducted prior to operations commencing.
The material is inside the 20ft. Container:
- Trawl net (Codend)
- Two side arms
- Hydraulic Winch
- Generator
Material: Net-boom
# Components

<table>
<thead>
<tr>
<th>Illustration Drawing</th>
<th>Real image</th>
<th>Name</th>
<th>Illustration Drawing</th>
<th>Real image</th>
<th>Name</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="bouy with fastening" /></td>
<td><img src="image2.png" alt="bouy with fastening" /></td>
<td>bouy with fastening</td>
<td><img src="image3.png" alt="segment sidearm in container" /></td>
<td><img src="image4.png" alt="segment sidearm in container" /></td>
<td>segment sidearm in container</td>
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<tr>
<td><img src="image5.png" alt="codend" /></td>
<td><img src="image6.png" alt="codend" /></td>
<td>codend</td>
<td><img src="image7.png" alt="shakel" /></td>
<td><img src="image8.png" alt="shakel" /></td>
<td>shakel</td>
</tr>
<tr>
<td><img src="image9.png" alt="eyelet for pulling" /></td>
<td><img src="image10.png" alt="eyelet for pulling" /></td>
<td>eyelet for pulling</td>
<td><img src="image11.png" alt="trawl net" /></td>
<td><img src="image12.png" alt="trawl net" /></td>
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<tr>
<td><img src="image13.png" alt="fast-shakel" /></td>
<td><img src="image14.png" alt="fast-shakel" /></td>
<td>fast-shakel</td>
<td><img src="image15.png" alt="weight" /></td>
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<tr>
<td><img src="image17.png" alt="hook" /></td>
<td><img src="image18.png" alt="hook" /></td>
<td>hook</td>
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Application for oil spills on water surface (e.g. oceans, lakes, rivers) especially for marine application; Suitable for air- and ship borne distribution; Suitable for application during bad weather conditions and on shallow water territories; Ship borne recovery by net booms;

The BioBind oil binder is made of biodegradable wood-fiber causes no environmental impact. It shows a high oil absorption capacity of approx. 600 kg m\(^{-3}\) especially for thin oil films down to 0.03 mm and a high retention capacity for oil. On water surface, the binder achieves an oil recovery rate of approx. 80 % with a coverage dosage of 11 %. The binder floats for more than 3 days. The binder material can be equipped with oil degrading microorganisms.
Step 1: Pull the net out of the container and put it together on the deck

If there is enough space on the deck, the net can be prepared on the way to the site! Otherwise, the net must be assembled and placed in the water directly at the place of use.

- 1.1 Pull trawl net out of the container
- 1.2 Remove sidearms buoy by buoy from container and connect to weights
- 1.3 Connecting the sidearms to trawl net
Step 1.1: Pull trawl net out of the container
Step 1.2: Connecting the side arm to trawl net

Open the shackle!
Two connections per site!

Deployment of the net boom from the transport ship → Transfer second side arm to tugboat → Offshore recovery → Net bag filled → yes → Loading net bag onto transport barge → Catching the net barrier → no → Offshore recovery

trawl net
side arm
Step 1.2: Connecting the side arm to trawl net

Connect shackle with the blue rope!

Wrap the connecting rope around the two green ropes. Tie the ends with a knot.

Deployment of the net boom from the transport ship → Transfer second side arm to tugboat → Offshore recovery → Net bag filled → Loading net bag onto transport barge → Catching the net barrier

no → yes
Step 1.3: Connecting buoys to weights

1. Take the free hanging metal rope from the buoy and connect the loop at the end of this rope to the fast shackle on the weight!
2. The buoy must NOT be on the side of the green curtain.
Step 2: Put net in water and hand over towing line

- Ship must move forward as slow as possible („Dead slow“)
- 1. Moor towing rope from the sidearm to the ship
- 2. Put aft buoy and trawl net in the water
- 3. Let the buoys slip into the water step by step
- 4. Hand over the auxiliary rope with the towing rope of the other side arm to the second ship
- 5. Moor towing rope on the second ship

IMPORTANT! Buoys form the outside of the U and the green courtain is on the inside.
The structure corresponds to a classic oil barrier.

Ships travel forward at slow speed until the cod end is full.

There are two ways to empty the codend:
- Retract the net and dump sorbents (Step 4a p. 20)
- Retract the net and replace the codend (Step 4b p. 28)
1. Towing vessel 2 moves close to the side of towing vessel 1!

2. Handover the second side arm! Towing vessel 2 moves to the end of the net boom!

3. Use a crane to pull out the codend by the yellow rope!

4. Hold the codend over an oil-safe container!

5. Open the codend!

6. Empty the codend!

7. Close the codend again and hang it back into the water!
Step 4a: Empty the codend

*Retract the net and dump sorbents*

Recovery with two ships

Towing vessel 2 moves to the side of towing vessel 1!

Handover the second side arm!
Towing vessel 2 moves to the end of the net boom!
Step 4a: Empty the codend

*Retract the net and dump sorbents*

Recovery with three ships

1. Vessel 3 moves to the end of the net boom!
2. Use a crane to pull out the codend by the yellow rope!
3. Hold the codend over an oil-safe container!
4. Open the codend!
5. Empty the codend!
6. Close the codend again and hang it back into the water!
Step 4a: Empty the codend

*Retract the net and dump sorbents*

Recovery with three ships

Vessel 3 moves to the end of the net boom!
Step 4a: Empty the codend

*Retract the net and dump sorbents*

Use a crane to pull out the codend by the yellow rope!  
Hold the codend over an oil-safe container!
Step 4a: Empty the codend

Retract the net and dump sorbents

Open the codend!

Empty the codend!

Open the knot
Step 4a: Empty the codend

Retract the net and dump sorbents

Close the codend again and hang it back into the water!

Pull the end of the net tightly together and close with a knot.
If there are still sorbents in the water, continue with step 2. (p. 18)
Otherwise go to step 5 “Retract the net boom” (p. 38)
Step 4b: Replace the codend

Retract the net and dump codend

Recovery with two ships

1. Towing vessel 2 moves to the side of towing vessel 1!
2. Handover the second side arm! Towing vessel 2 moves to the end of the net boom!
3. Use a crane to pull out the codend by the yellow rope!
4. Place the codend in an oil-safe container!
5. Separate codend from trawl net!
6. Attach a new codend and hang it back into the water!
7. Handover the side arm back to the second ship!
Step 4b: Replace the codend

Retract the net and dump codend

Recovery with two ships

Towing vessel 2 moves to the side of towing vessel 1!

Handover the second side arm!
Towing vessel 2 moves to the end of the net boom!
Step 4b: Replace the codend

*Retract the net and dump codend*

Recovery with three ships

1. Vessel 3 moves to the end of the net boom!
2. Use a crane to pull out the codend by the yellow rope!
3. Place the codend in an oil-safe container!
4. Separate codend from trawl net!
5. Attach a new codend and hang it back into the water!
Step 4b: Replace the codend

*Retract the net and dump codend*

Recovery with three ships

Vessel 3 moves to the end of the net boom!
Step 4b: Replace the codend

*Retract the net and dump codend*

Use a crane to pull out the codend by the yellow rope!

Place the codend in an oil-safe container!
Step 4b: Replace the codend

*Retract the net and dump codend*

Separate codend from trawl net!

1. Open the knot on the connection rope
2. Pull out the rope -> trawl net and codend are now separated
Step 4b: Replace the codend

Retract the net and dump codend

Attach a new codend and hang it back into the water!

1. Pull the rope alternately through a loop and a ring until all are connected
2. Close the rope with a knot -> trawlnet and codend are now connected
3. Hang it back into the water
Step 4b: Replace the codend

*Retract the net and dump codend*

If there are still sorbents in the water, continue with step 2. (p. 18)
Otherwise go to step 5 “Retract the net boom” (p. 38)
All components of these oil recovery unit should and can be reused.

The components are to be cleaned in the decontamination zone provided for in the management plan.

The procedure corresponds to the standard cleaning process.
Proposed set-up - container

Diagram details:
1. Deployment of the net boom from the transport ship
2. Transfer second side arm to tugboat
3. Offshore recovery
4. Net bag filled
   - yes: Loading net bag onto transport barge
   - no: Catching the net barrier
Step 5: Retract the net boom

- Deployment of the net boom from the transport ship
- Transfer second side arm to tugboat
- Offshore recovery
- Net bag filled
- Loading net bag onto transport barge
- Catching the net barrier

Start winch

On-board power

- p. 39

Generator power

- p. 40
Step 5.1: Start winch with on-board power

1. Set lever to „2“ (From Socket)
2. Connect the power cable
3. Press the green button
   → Hydraulic pump starts running
4. With Up and Down you can move the winch
Step 5.1: Start winch with generator power

1. Set switch to „1“ (From Generator)
2. Set switch „Generator“ to „ON“
3. Press button „Gen. Heating“ for 3s
4. Set switch „Generator“ on „START“ → Generator starts to run
5. Press green button → Hydraulic pump starts running
6. With Up and Down you can move the winch
Step 5.2: Attach the rope and pull it in

1. Unrolling the rope from the winch
2. Connect the rope to the net and pull it in (keep "down" pressed at the switch box)
Step 5.3: Pull it in

Pull in rope until stop
While pulling in:
- Sever the connection between the weight and the buoy (fast-shakel)
- Hang buoys in zigzag (look top view)
When the winch has been pulled up to the stop, fasten the safety rope. The safety rope can be attached to the weights (1) or to the buoys (2).
Step 5.5: Disconnect safety rope

When the safety rope has been fastened, unwind (1) the winch rope slightly. Disconnect (2) the eyelet or the hook from the side arm. Unwind (3) the winch rope and reconnect it to the side arm. You can connect it, with the weight or the buoys. Disconnect the safety rope from the side arm.

Repeat step 5.3 to 5.5 until both side arms are in the container.
At the end stow the trawl net and the codend on the bottom below the side arms.