

HENRIKSEN

REDUCING OPERATIONAL RISK

SPILLRECS

OIL SPILL RECOVERY SYSTEMS





REDUCING OPERATIONAL RISK

HENRIKSEN HAS A BRAND VISION THAT IS ROOTED IN OVER 150 YEARS OF EXPERIENCE. OUR VISION HAS BEEN SHAPED BY OUR FOUNDING FATHERS AND MANY GENERATIONS OF FOREFATHERS. THEIR FIRST HAND EXPERIENCE AND CHALLENGES HAS OVER TIME PROVEN THE TRUE OVERREACHING VISION FOR HENRIKSEN TO ALWAYS LOOK FORWARD WITH THE INTENT OF CREATING SAFER OPERATIONAL CONDITIONS. WE ARE COMMITTED TO CREATE SAFER OPERATIONAL CONDITIONS WORLD WIDE.

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ABOUT HENRIKSEN

Henriksen was founded in 1856 based on the maritime industry, and is located in South East Norway. We have approx. 50 employees with our own production and engineering team.

Henriksen has evolved into four major business areas as indicated below and is engaged in business all over the world. Approximately 80% of our revenue is in export markets. SPILLRECS is our brand name for all the products within the oil recovery products.



ABOUT HENRIKSEN SPILLRECS

Henriksen started the development and production of oil spill products in the early 1980s. The Norwegian Coastal Administration (NCA) was from the beginning an innovative and demanding customer, reaching for the best.

The FoxTail has since then been an important product in our SPILLRECS portfolio.

With the FoxTail in place, new oil spill products became natural, as the HPU's and the KLK-Foxdrum. We also produced machinery for other oil spill manufacturers.

In the past years, we have invested heavily in developing new SPILLRECS products. Particular focus has been on light and mobile equipment for faster response to shoreline cleaning.

Equipment for shoreline cleaning - which maybe is the most laborious part of an oil spill - has been a neglected chapter in the industry. The new tools must be robust, effective, and easy to man-carry into the actual arena, that often is far from good infrastructure.

We are proud to be the only company that had two projects assumed in NOFO's technology program "Oil Spill Response 2010": the FoxBarge and the FoxTail mini. We have also continued the good cooperation with the NCA for new product developments. This has resulted in the FoxBlower and the FoxMix.

REDUCING OPERATIONAL RISK AND MAXIMIZING OPERATIONAL PERFORMANCE

DISCLAIMER

Great effort has been made in order to produce accurate and correct information in this catalog. There is always a possibility that an error has occurred. Designs and dimensions of the products listed in this catalog were correct at the date of publication but are subject to change without notice. Please ask for our confirmation in cases where accuracy is critical. Typographical and pictorial errors that are brought to our attention will be corrected in subsequent issues.

USER SCENARIOS

We provide a wide range of specialized solutions in oil spill response for each area, where each product is unique in the world. Products range from sea rescue cannon to prevent unmanned vessels colliding with offshore platforms or grounding, via effective skimmers that can handle large span in viscosities and difficult operating conditions to equipment to mechanize shorecleaning and roads.





ARCTIC

Arctic represents well the hardest and toughest conditions imaginable for oil spill recovery equipment.

- PRODUCTS:
- Foxtail
 - Foxtail Mini
 - Arctic Foxtail
 - FoxBlower
 - Emergency Unload System
 - SeaClaw
 - Hydraulic Power Unit



OFFSHORE

Harsh weather, high security and large capacities are among the challenges in this category.

- PRODUCTS:
- SeaClaw
 - Foxtail
 - Emergency Unload System
 - FoxDrum
 - Hydraulic Power Unit



OPEN SEA

Changing weather conditions and distance to land are some of the challenges to deal with in this category.

- PRODUCTS:
- SeaClaw
 - Emergency Unload System
 - Foxtail
 - FoxDrum
 - Hydraulic Power Unit



SHORELINE

The majority of the work and the cost of an oil spill comes when the oil reaches the coast.

- PRODUCTS:
- FoxMix
 - Foxtail Mini
 - FoxBlower
 - FoxBarge



HARBOURS

The challenges here are to provide a simple, reliable, efficient and easily accessible equipment.

- PRODUCTS:
- Foxtail
 - Foxtail Mini
 - FoxBlower
 - FoxMix
 - FoxBarge
 - FoxDrum
 - Emergency Unload System
 - SeaClaw
 - Hydraulic Power Unit



RIVERS/LAKES

Logistics can be challenging in these scenarios. The equipment must be portable and easily accessible.

- PRODUCTS:
- Foxtail
 - Foxtail Mini
 - FoxBlower
 - FoxMix
 - FoxBarge
 - Hydraulic Power Unit



ROADS

Large amount of oil and chemicals are transported by road. In addition to danger of pollution can road closure be critical.

- PRODUCTS:
- FoxMix
 - FoxBlower

THE FULL CITY CATASTROPHE



On the morning of 30 June 2009, the bulk carrier MV Full City set sail from Skagen in Denmark. The vessel was carrying around 1,100 tonnes of heavy oil and some diesel.



FOTO : KYSTVERKET

On the morning of 30 June 2009, the bulk carrier MV Full City set sail from Skagen in Denmark. The vessel was carrying around 1,100 tons of oil, mostly heavy bunker, but also some diesel.

The vessel was in ballast at the time and was going to take on artificial fertilizer at Herøya in Porsgrunn. The Full City dropped anchor outside Langesund - only 0.9 nautical miles from the nearest land - on the orders of the vessel's agent while awaiting a quay berth while storm warnings were broadcasted over the radio.

The anchor broke and the ship grounded a half hour later. The ship did not announce that they had problems. Strong winds and high seas increased the damage to the vessel during the night before the vessel settled on the rocks. The vessel suffered extensive hull damage, which resulted in an oil spill. This polluted the coastline, which included a number of conservation areas and bird reserves.

The accident occurred at night, in bad weather, on a weekend during a Norwegian general holiday. It had also

been a generation since the last major oil spill. What's more, this spill occurred in an ecological sensitive and economically important coastal area.

Of the total 1,154 tons of oil that was on board Full City, 27 tons were recovered in the maritime operation, 74 tons were recovered in the shore operation, 860 tons were pumped out of the disabled vessel, and 191 tons of oil were left in the environment. Around 3,000 tons of oil-contaminated waste was sent to landfill sites.

Around 200 location along 120 km of coastline were polluted with oil. The area contaminated with oil included 37 protected nature and bird reserves and geologically protected areas. Many recreational areas and private properties were also polluted with oil. More than 2,000 sea birds died as a direct result of the incident. 22 trailers with 30,000 sacks with natural sorbents was used to protect the birds from oil, make clean/dirty borders and for generally clean up.

The Full City accident was the direct reason we started to develop our highly portable line with FoxBlower, FoxMix and FoxTail mini products.



Full City grounded outside Langesund.



Shore cleaning.

SHORELINE

SPILLRECS is Henriksen's oil spill response line. For Shoreline operations we have a series of products. They are all portable, with their own engine. Weight and mobility were key considerations during development.



1. Cleaning shoreline after Full City catastrophe, 2. FoxBlower, 3. FoxMix, 4. FoxBarge

FOXBLOWER



The FoxBlower has been developed in cooperation with The Norwegian Coastal Administrations. It is a powerful system to distribute different types of absorbent using a fan driven by a 11 kW, 4-stroke petrol engine.

The System is portable by two persons making it highly efficient and versatile in seashore use, where transport using vehicles is almost impossible. For the operators, the safety is considerably improved.

MAIN FEATURES

- Lightweight
- Extremely portable
- Adjustable power and speed
- 0 - 100 l/min absorbent

Dimensions (mm) L x W x H	Carry weight	Weigth with gasoline tank	Hose
1250 x 825 x 1250	100 kg	135 kg	12 m

FOXBARGE



The FoxBarge is a combined working-platform and gangway. It is easy to transport by road and to mobilize. It is for use during oil spill response operations in shoreline areas.

FoxBarge 40' is a simple and lagre (60 m²) working platform for use during oil spill response operations in shoreline areas. It is to be stored and transported as a standar 40' container. The vessel is very sturdy and simple: 2 outboard motors provide propulsion and can be steered from a fixed or radio controlled console. It is very maneuverable. The deck has a standard anchor point for deck cargo, crane and other equipment.

The work platform is to be used together with various other equipment in an oil spill response operation on the shoreline areas. It has been designed to stand dry at low tide even with a full load.

The platform equipment will be modular to ensure good flexibility.

MAIN FEATURES

- Easy to mobilize and manouvre
- Remote controlled
- Two 115 hp Yamaha motors
- 60 m² work platform
- Stored and transported as a 40' container

FOX MIX

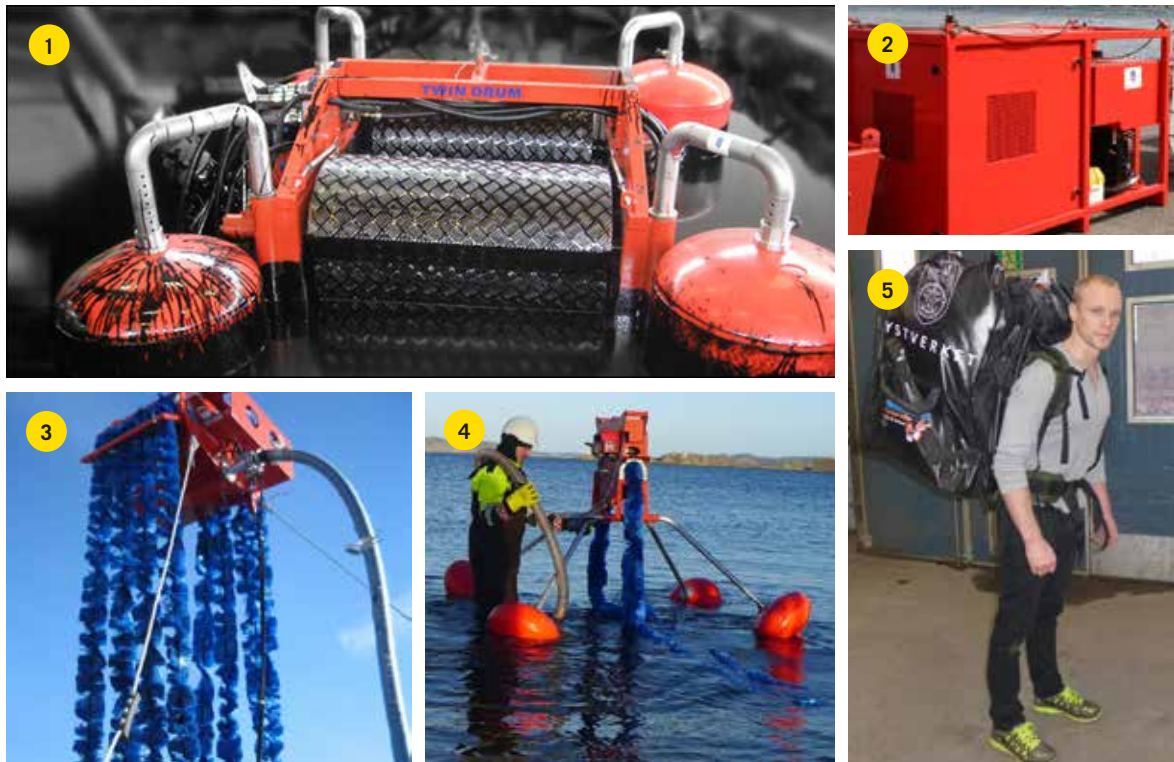
Henriksen's newest product; FoxMix has been developed in cooperation with The Norwegian Coastal Administration. FoxMix is a user-friendly machine that efficiently mixes all natural sorbents into oil spills, so this can simply be picked up. FoxMix can be delivered with several different brushes for different surfaces and oils. The brushes can easily be changed.

MAIN FEATURES

- Great advantages when it comes to operator efficiency and HSE
- Honda 25GX
- Different brushes for different surfaces and spills

OIL SKIMMERS

Oil skimmers are machines that separate liquid oil from the water's surface. This technology is commonly used for oil spill remediation.



1. FoxDrum, 2. Hydraulic Power Pack, 3. FoxTail, 4. FoxTail Mini, 5. Easy to carry FoxTail Mini

Oil is a hydrocarbon, and most hydrocarbons have a lower specific gravity than water. This causes most oils to float on water. Oils also bond more tightly to itself than to water. This is important when you try to catch the oil with a skimmer.

However, skimming oil after an oil spill accident has many challenges:

- The oil can have many different conditions and viscosities.
- Debris or trash are often mixed in with the floating oil.
- There are often natural difficulties such as waves, wind, or ice.

The skimming have to be efficient and tackle the above difficulties while capturing as little waster as possible to avoid costly oil/water separation or disposal of oily water after recovery. There are several types of skimmers all with different pros and cons. The most common types are: weir, drum, discs, brush and mops-skimmers.

FOXTAIL



VERTICAL ADHESION BAND OIL SKIMMER

The V.A.B. FoxTail Oil Skimmer was developed and tested at the Norwegian Pollution Control Authority (NPCA/SFT) base in Horten, Norway. Since 1984 several units have been in service in the North Sea on board specialized oil recovery vessels operated by the Norwegian Coastal Administration. Not only is the V.A.B. FoxTail Oil Skimmer capable of recovering large quantities of oil, but it performs equally well also in rough sea. The FoxTail has been tested with success in 4 m high waves in the Norwegian coastal waters..

OPERATION PRINCIPLE

Heavy and light oils are collected from the water surface by the FoxTails endless high-performance adhesion band (mops). These fibrillated polypropylene bands collect (adhere) oil when moving through the water. The oil is squeezed out of the FoxTail inside the machine by special rollers. Oil collected in the skimmer is then pumped onboard/ashore into the collection tank. The FoxTail skimmers are light weight and can hang from a single wire.

MAIN FEATURES

- High capacity oil recovery
- Low weight – simple construction
- Unaffected by waves
- Portable and requires only a single wire suspension
- Operates well among floating objects even ice
- Not sensitive to oil viscosity or temperature
- Provided with bumpers for motor protection
- Provided with two guide ropes with tension damper
- FoxTail are as standard delivered in a sturdy aluminum container that also can be used as temporary reservoir for the collected oil
- Nozzles for steam or hot water are standard on all FoxTails. Both above the mops and in the outlet. For heating and “lubricating” the hose.

Product Name	Capacity m³/h	Weight Empty	Weight Operating	Weight of system with container	Dimensions skimmer (m) L x W x H	Dimensions container (m) L x W x H	Number of Mops	Size of Mops	Length of Mops
VAB 8-14	80 m³/h	900 kg	1400 kg	2255 kg	2,2 x 2,4 x 1,1	4,2 x 2,5 x 1,9	8	14"	15 m
VAB 4-9	35 m³/h	540 kg	700 kg	1360 kg	1,7 x 1,6 x 1,0	3,0 x 2,2 x 1,9	4	9"	15 m
VAB 4-6	20 m³/h	220 kg	420 kg	1005 kg	1,7 x 1,6 x 1,0	2,7 x 1,7 x 1,5	4	6"	10 m
VAB 2-6	9 m³/h	125 kg	220 kg	454 kg	0,9 x 0,7 x 0,8	2,2 x 1,4 x 1,3	2	6"	10 m

FOXTAIL



2-6



4-6



4-9



8-14



FOXTAIL MINI



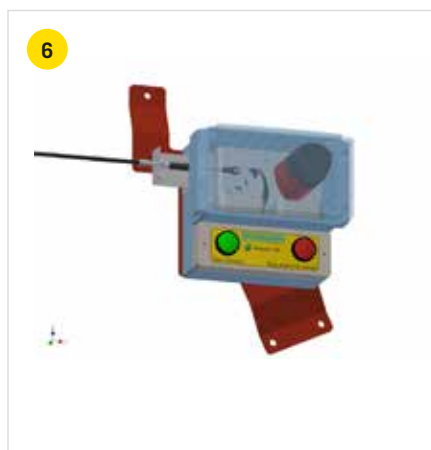
FoxTail MINI was developed through NOFO’s technology development program “Oil Spill Response 2010” (Program for developing new oil spill products). The objective was to make a mop skimmer that is lightweight and can be moved by one or two persons on shorelines. This means that this tool can be used in places that are not accessible using a standard FoxTail without having to rely on machine power to lift or move it. The FoxTail Mini can be used with or without a pump. Lighter oils can flow from the machine to a storage reservoir using gravity. Heavier oils can be pumped with the specially designed FoxPump, or other transfer pump.

MAIN FEATURES

- No hydraulic power needed
- Easy to carry
- Not affected of floating objects or ice
- Prepared for adding steam or hot water
- Easy to operate the joint and adding more mops
- Good solution in waves
- Developed through NOFO’s“oil spill response 2010”
- Motor: Kawasaki 48TH
- Gasoline: regular 2T 95 Octan 2%
- Outlet: 2,5”
- Mop speed: 1 – 50 m/min

Product Name	Capacity m³/h	Weight Empty	Weight Operating	Dimensions (mm) L x W x H	Number of Mops	Size of Mops	Length of Mops
VAB 1-6	3 m³/h	33 kg	50 kg	618 x 410 x 755	1	6"	10 m

FOXTAIL MINI Options



1. FoxPump, special designed that also can tackle heavy oil. 6 m³/h, 9 bar, 2. Floating pulley, 3. Backpack (can be carried of one or two people), 4. Floating kit with bag, 5. Extra set of hoses in bag (5m suction and pressure), 6. Wireless remote control

FoxPump is a powerful pump that can tackle “wet soil”. The FoxPump uses a 6,3 kW Honda four-stroke engine and Vogelsang pump and can handle solids up to Ø20 mm. This pump is specially designed for FoxTail MINI. It is portable on big wheels and possible to carry.

Floating elements can be used if you do not have a crane available or when working in shallow water.

ARCTIC FOXTAIL



The Arctic FoxTail is a new winterized version of the standard FoxTail VAB (Vertical Adhesion Band) skimmer. It has all the old qualities, and the additional integrated transfer pump, insulated cover and a hydraulic heating system, that heats both the hopper and the air circulating in the skimmer. Where a standard FoxTail can run in min. -6°C, the Arctic FoxTail can run in min -21°C under the same sea temperature and wind conditions. The standard configuration is 200 lpm and 200 bar with LS and Closed Center, but other configurations are available. Arctic FoxTail was developed through NOFO and the NCA' "Oil Spill Response 2015" (Program for Developing New Oil Spill Technologies).

MAIN FEATURES

- Insulated
- Protected from wind, snow, rain and spray
- Hydraulic heating circuit with both hot plates and air heat exchanger
- High capacity oil recovery
- Unaffected by waves
- Portable and requires only a single wire suspension
- Operates well among floating objects and ice
- Not sensitive to oil viscosity or temperature
- Provided with two guide ropes with tension damper
- Nozzles for steam or hot water - both above the mops and in the outlet - are standard on all Arctic FoxTails for extra heating and lubricating the cargo hose.

Product Name	Capacity m³/h	Weight Empty	Weight Operating	Dimensions (mm) L x W x H	Number of Mops	Size of Mops	Length of Mops
Arctic FoxTail	35 m³/h	1150 kg	1300 kg	2100 x 1700 x 1700	4	9"	5 x 3 m = 15 m

FOXDRUM -402 / -602



The FoxDrum handles oils of most viscosities, from heavy crude oils to light oils. The FoxDrum has been specially designed to operate with heavy crude oils both at open sea and in ports, at temperature down to the freezing point. The FoxDrum operates well in rough sea without admitting unwanted water. It handles most types of debris, ropes, wood, sea grass, birds etc. without difficulty. The two drums collect oil from opposite directions which doubles the capacity.

For minimum storage space and rapid and effective maintenance the pontoons can easily be removed. With the FoxDrum skimmer you can handle all types of oils with the same skimmer. The drums have a special shape to agitate the oil and draw it down into the skimmer sump.

Both the **FoxDrum-402** and the **FoxDrum-602** are high quality products, manufactured of first-class materials, chosen to withstand very corrosive environments.

MAIN FEATURES

- Handles viscosities from 10.000 cst
- High recovery efficiency
- Handles most types of debris
- Low maintenance
- Aluminum Scimmer frame
- Oil Separation 95 - 98%
- TEMA Hydraulic Couplings (or costumers choice)

The FoxDrum 602 has a built in Desmi 250 pump and a special screw that force the oil into the pump. The FoxDrum 402 has an external Vogelsang pump.

OPTIONS

- Can be delivered with water injection flange
- Can be delivered with transport container in aluminum that also can be used as temporary reservoir for the collected oil.

FoxDrum	Dimensions (mm) L x W x H (with pontoons)	Draught	Weight (with pontoons)	Shipping volume	Capacity	Oil Separation	Hydalic motors	Hydraulic Power
-402	1250 x 1150 x 900 (1950 x 1800 x 900)	300 mm	95 kg (130 kg)	1,2 m ³	50 m ³ /h	95-98%	DANFOSS	15 kW
-602	1900 x 1900 x 1300 2400 x 2400 x 1300	400 mm	360 kg (410 kg)	3,5 m ³	90 m ³ /h	95-98%	DESMI DS-250	30 kW

HYDRAULIC POWERPACK



The Hydraulic Powerpack is a hydraulic power unit for operating the FoxTail-, FoxDrum- skimmer or other devices. The standard version consists of a fixed pump with a bypass valve and an oil cooler. The pump is driven by a noise insulated air-cooled diesel engine.

MAIN FEATURES

- Can be delivered with variable displacement pump
- Driven by a noise insulated air-cooled Hatz diesel engine
- Can be delivered with possibility for utilizing accumulated electric power 12 V / 450 W
- Other combinations of pumps / rpm gives many different versions
- Completed with hydraulic oil. (if practical to transport)

Type	P (bar)	Q (l/min)	Fit to skimmer	Dimensions (mm) L x W x H	Weight (kg)
120/60-D	120	60	2-6	1500 x 800 x 1100	770
150/75-D	140	75	4-6	1500 x 800 x 1100	770
140/90-D	140	90	2-9	1850 x 900 x 1200	1050
150/110-D	150	110	4-9	1850 x 900 x 1200	1050
150/150-D	150	150	8-9	2130 x 1000 x 1300	1200
150/200-D	150	200	8-14	2130 x 1000 x 1300	1200



SEA RESCUE

Being a seafarer is a challenging life. If you experience engine stop or other problems in harsh weather you might need assistance or even worse, you maybe have to leave the ship. To catch an abandoned vessel, to be able to tow it, can be close to impossible.



FOTO : KYSTVERKET

SEACLAW



The SeaClaw is a tough and reliable maritime rescue system, based on well proven technology. The SeaClaw is designed to intercept drifting objects and prevent groundings or collisions with offshore structures. The SeaClaw can also be used to capture abandoned vessels or for MOB rescue.

SEACLAW GRAPNEL

Designed for catching onto railing or other superstructure projections.

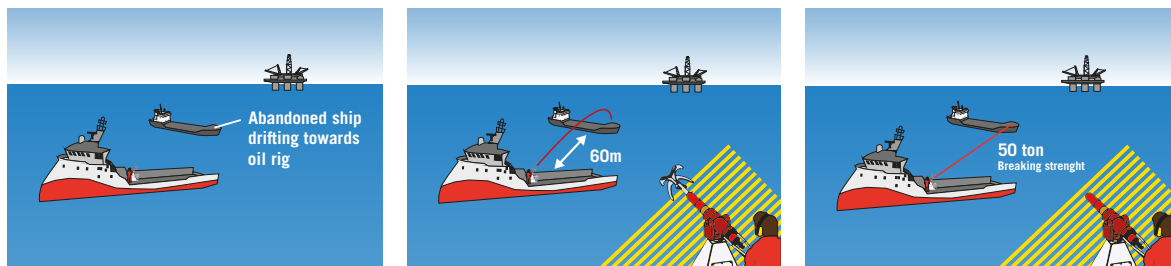
SEACLAW LIFESAVER

Designed for rescue of man overboard or smaller rescue crafts. Both rope and projectile are self floating and equipped with Florence markers for easy tracking, even in the dark.

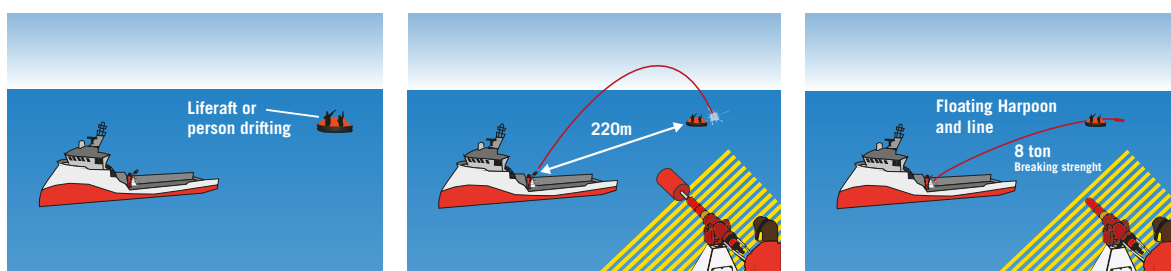
SEACLAW SPEARHEAD

Heavy duty self attached torpedo harpoon designed for penetration of superstructure hull.

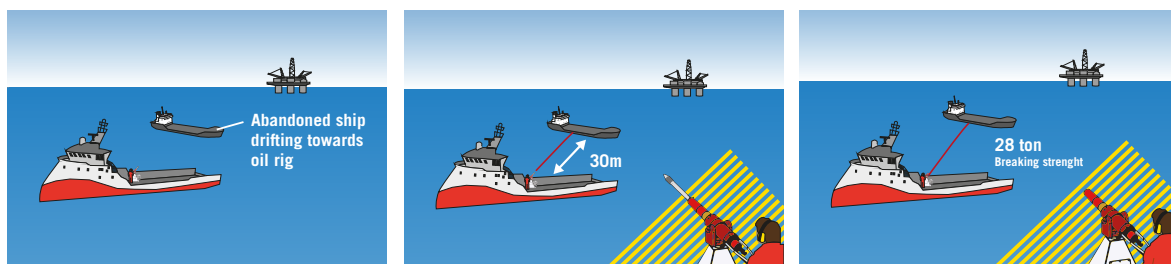
SEACLAW GRAPNEL PROCEDURE



SEACLAW LIFESAVER PROCEDURE



SPEARHEAD PROCEDURE



Type	Range	Length of towline	Line Breaking strain
SeaClaw LIFESAVER	200 - 220 m	220 m	8,5 tons
SeaClaw GRAPNEL	50 - 60 m	70 m	50,0 tons
SeaClaw SPEARHEAD	30 - 40 m	50 m	28,0 tons

EMERGENCY UNLOAD SYSTEMS

Maritime casualty situations often involve rapid offloading of fluids. The Emergency Unload System allows rapid offloading of fuel oils or water from distressed vessels.



Often helicopter access is the only means to access a distressed vessel. Accordingly, the system is light and suitable for helicopter transport. The system produces no sparks during transportation or use and

is self powered in the case of deadship conditions. Additionally, the system can handle a range of fluids from light oils/diesel to heavy fuel oil to water.

EMERGENCY UNLOAD SYSTEM



The Emergency Unload System is specially designed for helicopter transport to the vessel.

The system is complete with hoses and hydraulic power unit and uses no electrical components.

Hydraulic power is provided by on onboard 112 kW Cummins diesel engine and provides 200 l/min at 200 bar. and provides 200 l/min and 200 bar.

MAIN FEATURES

- Emergency Unload System 112 kW
- 200 l/min
- 200 bar
- Prepared for chopper transport
- No electrical components
- 3 different types of pumps (submergable, transportation og waterinjection)
- Reels with cargohoses and hydraulic hoses
- Each unit weighs less than 1000 kg
- Pumps with water injection flanges



PRIDE AND TRADITION SINCE 1856

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