

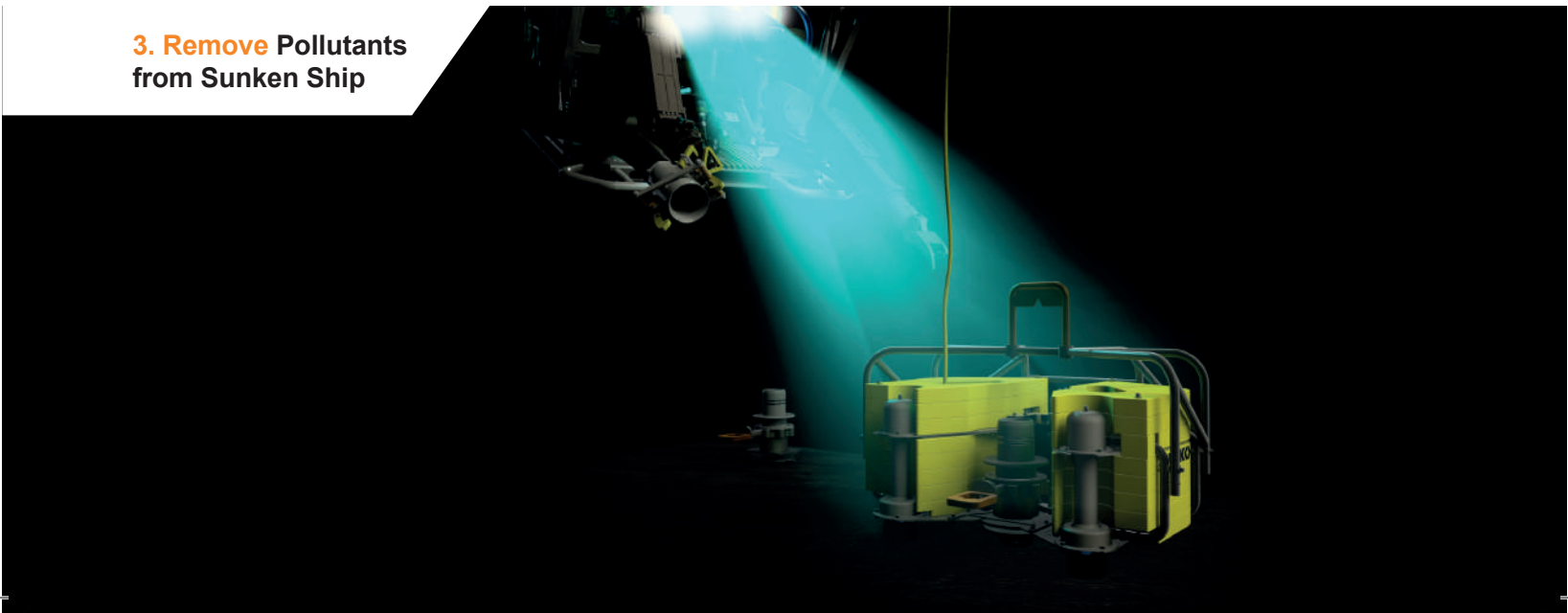
**1. Prevent** Grounding  
of Drifting Vessels



**2. Contain** Pollutants  
inside Damaged Hull



**3. Remove** Pollutants  
from Sunken Ship





## This is Miko Marine

Miko Marine AS (Miko) is an innovative solution-provider to the marine industry. Solutions based on the use of the company's original idea - a patented magnetic patch called Miko Plaster® - have been supplied to clients worldwide, including navies, governmental institutions, ship owners, diving companies, subsea contractors and oil service companies.

Since 1996, Miko has developed a range of effective solutions to reduce the risk of oil spill, increase effectiveness and increase safety in the marine industry. Miko is part of Miko Group of Companies and co-located with our 50% owner, Buksér og Berging AS just outside Oslo, Norway.





Miko's philosophy has been to enhance safety at sea and reduce the risk of oil spill resulting from accidents at sea. Consequently, oil spills resulting from such accidents dramatically will reduce the quality of life in the marine environment and to people living close by with enormous economic consequences.

Miko has since 1996 developed a range of effective solutions to reduce the risk of oil spill catastrophes based on three principles:

- Preventing grounding of drifting vessels
- Containing pollutants inside a damaged hull
- Removing pollutants





## ShipArrestor - First Line of Defence

When a ship loses power or manoeuvrability, she tends to turn sideways to the seas and begins to roll heavily. The rescue tug is then given the challenging task of establishing a tow to the ship. If the crew has abandoned the ship, this becomes even more difficult, and may take several days to accomplish. Meanwhile, the ship may drift to shore or simply break apart in the middle of the ocean.

ShipArrestor provides multiple solutions to this situation by reducing both the damaging rolling motion, and the speed at which she drifts towards the beach or an oil platform. It is flown out to the ship by helicopter, installed remotely without personnel on the ship, and can then be used as a ready-to-go towline for the first arriving tug to bring her to safety.

## Miko Plaster - Second Line of Defence

A ship's integrity is based on an intact hull. If the integrity is lost, the ship will experience water ingress with the associated risk of sinking- or the tank content may escape into the environment.





By providing a fast and predictable barrier, being flexible in shape and size and without introducing other risk elements, Miko Plaster will potentially prevent the vessel from sinking - or alternatively contain the pollutant inside the damaged compartment.

## Moskito - Third Line of Defence

There are more than three million shipwrecks worldwide. Many of the sunken vessels contain oil and are in poor condition, representing a severe risk of pollution. Those having sunk during the two world wars are now in especially poor condition. Many governmental authorities have taken action and the associated responsibility for removing the oil.

Miko's patented Moskito solution offers a versatile and safe method of removing the oil. Miko's solution for oil removal is offered to both governmental oil removal projects from old vessels and for more recent accidents to the salvage industry. The system is rapidly deployable and can be air-freighted anywhere on short notice.





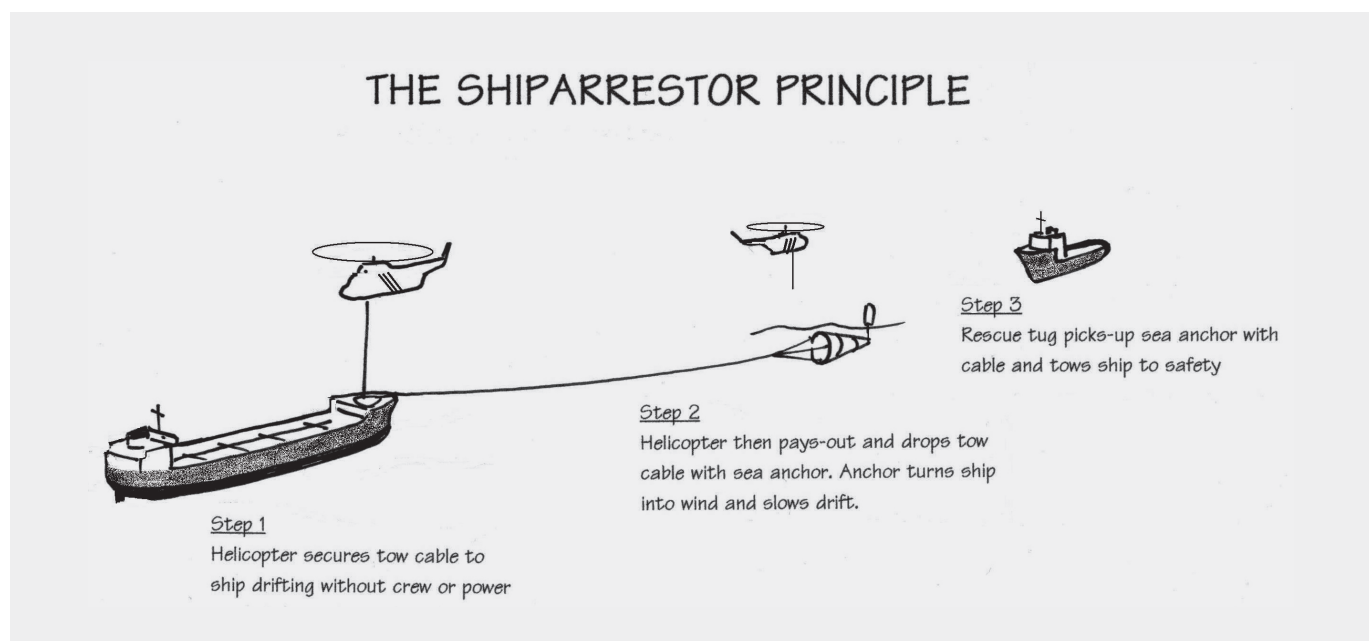
# ShipArrestor

## First Line of Defence

The ShipArrestor is an integrated salvage and preparedness tool for harnessing drifting ships that are at risk of colliding with other objects, running aground or sinking. It is brought to the casualty with the speed of a helicopter.

The main components are:

- Connector
- Towline
- Sea anchor
- Pickup system



The connector is deployed over the windlass of the casualty by the helicopter. It consists of a light-weight steel chain inside a circular plastic tube frame maintaining a circular shape of 6m diameter.

The towline, sea anchor and pickup system are packed in a deployment bag, which is then released into the water. The sea anchor turns the bow up against the wind, reducing the drift rate by up to 50% and eliminating the rolling motions.

As a result, valuable time is gained for a tug to arrive before the casualty collides with another object or hits the shore, while the wave-induced stresses on the structure are significantly reduced.

When the tug arrives, the crew can use the pickup system to retrieve the line from the water and use the ShipArrestor to tow the ship to safety.

The patented ShipArrestor has been developed with the support of a consortium of European companies led by Miko Marine and supported by the European Union. It is manufactured by Coppins Sea Anchors Ltd, which is a world-leading producer and developer of sea anchor systems. Miko Marine is now a proud supplier of two ShipArrestor units to the Norwegian Coastal Administration.





# Miko Plaster

## Second Line of Defence

The term Miko Plaster® is used for magnetic and non-magnetic patches for the purpose of generating a fast, flexible and reliable barrier between the ship interior and the open sea.

### Magnetic Miko Plaster

The patented Magnetic Miko Plaster is a magnetic tarpaulin qualified by DNV GL for sealing sea chests, water inlets and outlets under the water line while the ship is afloat. The seal is achieved by the water pressure coupled with the magnetic adhesion between the patch and the steel surface. The magnetic tarpaulins are designed for long term storage and are not demagnetized after use.

The outer layer is a polyester-reinforced PVC matting, strong enough to lift an average car with a 50 mm wide stripe. The inner layer is a nitrile rubber sheeting that provides the magnetic holding force as well as strong frictional force and sealing effect against the steel surface. The larger sizes of Miko Plaster are equipped with a buoyancy sheet to facilitate easy handling under water.

### FlexiShape Miko Plaster

FlexiShape Miko Plaster® is intended for repair of hull damage below the waterline from groundings or collisions. It is stapled to the hull using either the Underwater Fastener or the Miko Fix. The temporary and quick repair is carried out while the ship is afloat.

The outer layer is a polyester-reinforced PVC matting, strong enough to carry the weight of an average car with a 50 mm wide stripe. The inner layer is a Kevlar fabric, similar to bullet proof vests, which protects the patch from sharp edges on the damaged hull. The material is flexible to follow the hull curvatures. The rubber stripes along the edges help improve the seal when pressed against the hull surface by the fasteners.





## Miko Plaster Kits

Miko has designed and developed special kits for different purposes and applications. The kits are produced in Norway and can be delivered quickly in urgent situations. The kits contain supplementary tools, such as powerful underwater magnets, and instructions for installation. Customized patches are supplied in any shape and size.

Kits include:

- Emergency Response Bag (ERB) – (First aid kit)
- Tanker Kit – for blanking off sea-chest – allowing for In-water repair operations
- Salvage Kit – for salvage and wreck removal operations
- Yacht Salvage Kit-purposely designed for yachts in association with Capt. Nick Sloane
- Tank Sealer Kit – Designed for use on tanks with an internal over pressure.



Magnetic Miko Plaster



FlexiShape Miko Plaster



Tank Sealer Kit



Yacht Salvage Kit



Emergency Response Bag



Tanker Kit





# Moskito

## Third Line of Defence

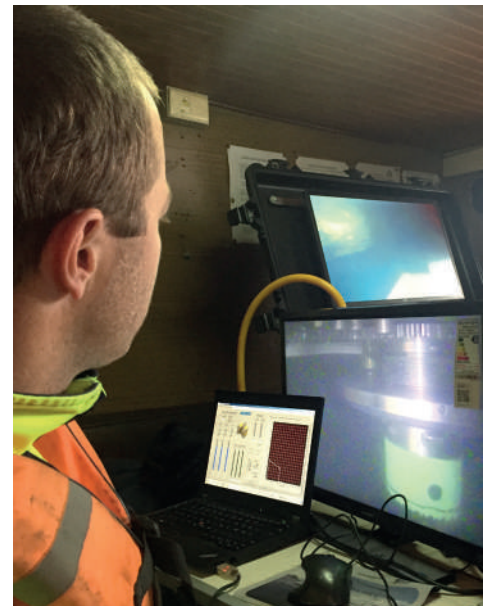
The Moskito is an all-electric, remotely operated hot tap tool developed for recovering oils and other pollutants from sunken vessels. Using patented technology, three steps are combined in one machine:

- Securing machine to hull
- Drilling drain holes for inlet and outlet
- Fastening valve and hose connection

The entire process is operated and monitored from a surface laptop. ROV or divers are only used to position the tool on the wreck, open and close the valve and connect hoses if required. Moskito is secured to the hull using three powerful electromagnets. The tripod legs are controlled individually with high precision, allowing the operator to align the machine accurately on curved or uneven surfaces. For greater depths, the Moskito can be run directly via the ROV.

### Drill Unit

The Drill Unit is at the heart of the machine. When the Moskito unit is released from the hull, the Drill Unit remains firmly in place. On top of the drill bit is a valve with an ROV-friendly hose connection. Once the hose is connected to the Drill Unit, the valve can be opened and the oil is pumped to the surface.





## Pumping system

Heavy oils, deep water, low temperatures and highly viscous fluids impose extreme demands on the pumping system. Miko's heavy-duty pumping spread includes an electrically operated and frequency controlled positive displacement pump which is submerged onto the wreck close to the tapping location. The pump can lift fluids of any viscosity, ranging from diesel to heavy fuel or crude oils. The control panel gives direct feedback of the power consumption at any given moment. This enables the crew to maximise the pumping speed to the conditions at hand while the power consumption indicates whether the pump is lifting seawater or oil.

The suction hose is equipped with a coupling that is stabbed onto the Drill Unit. The automatic latching system, along with the robust and simple release mechanism, makes the connection and disconnection an easy task for both divers and ROV.

The amount of water pumped is thereby kept to a minimum. The oil is pumped into a tank chosen specifically for the task, such as ISO tanks on deck, or the surface vessel's internal tanks. At extreme depths, submerged tanks may be considered.







## CONTACT US WITH YOUR CHALLENGES

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