

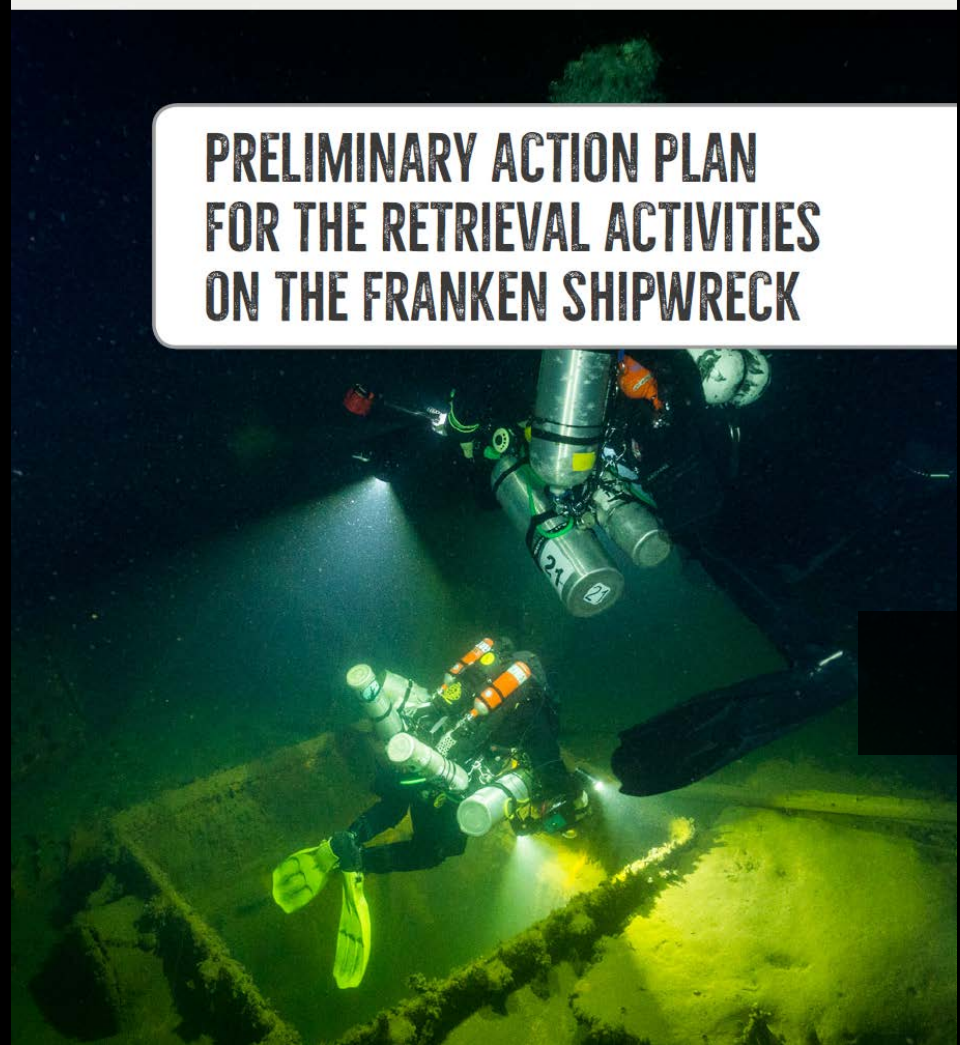
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Overview of the available technologies and case studies for oil recovery from shipwrecks

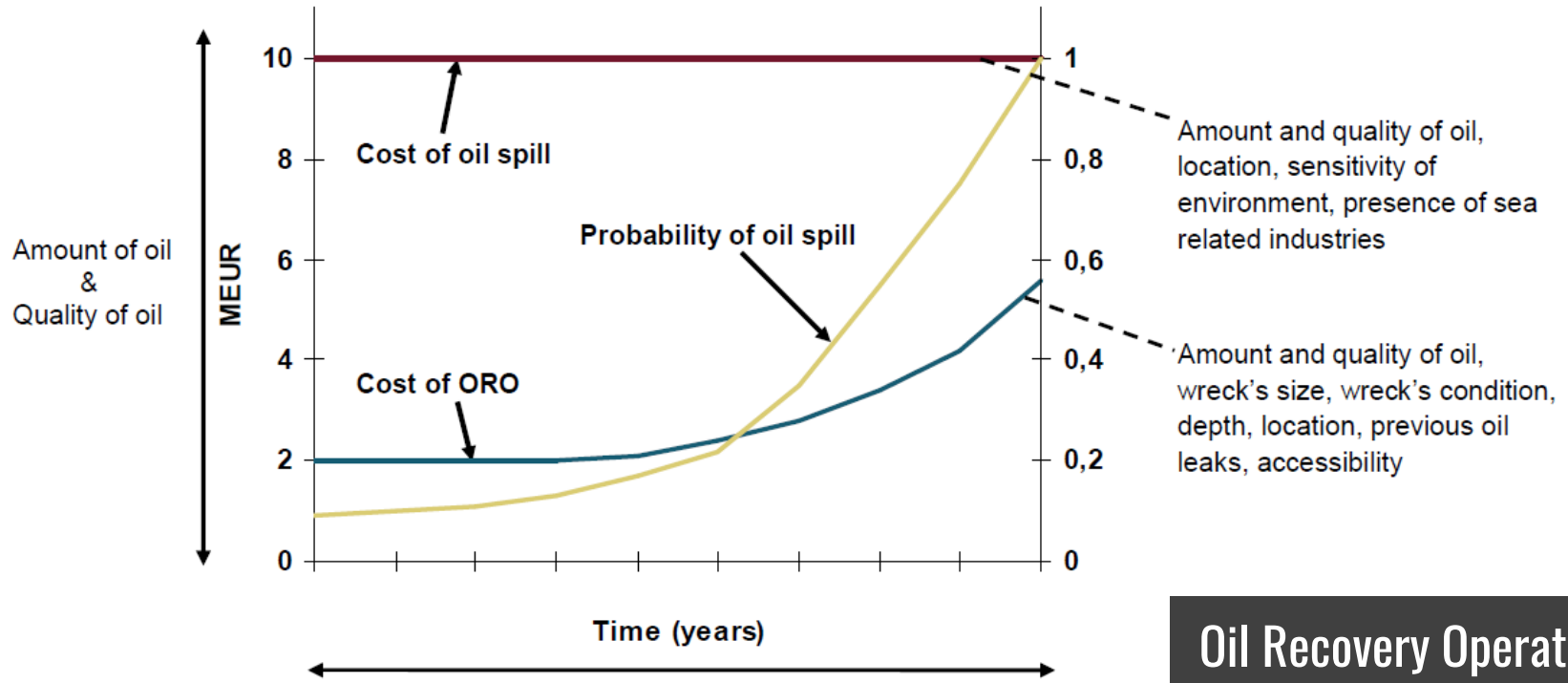
Karinne Ltd, Kari Rinne, 2019-02

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PRELIMINARY ACTION PLAN FOR THE RETRIEVAL ACTIVITIES ON THE FRANKEN SHIPWRECK



Well done.



Wreck's and oil tanks' condition, oxygen and salt concentration, sensitivity for weather, currents, seabed stability

Oil Recovery Operation Costs

Case Study

Grounded dry cargo vessel PAMISOS.

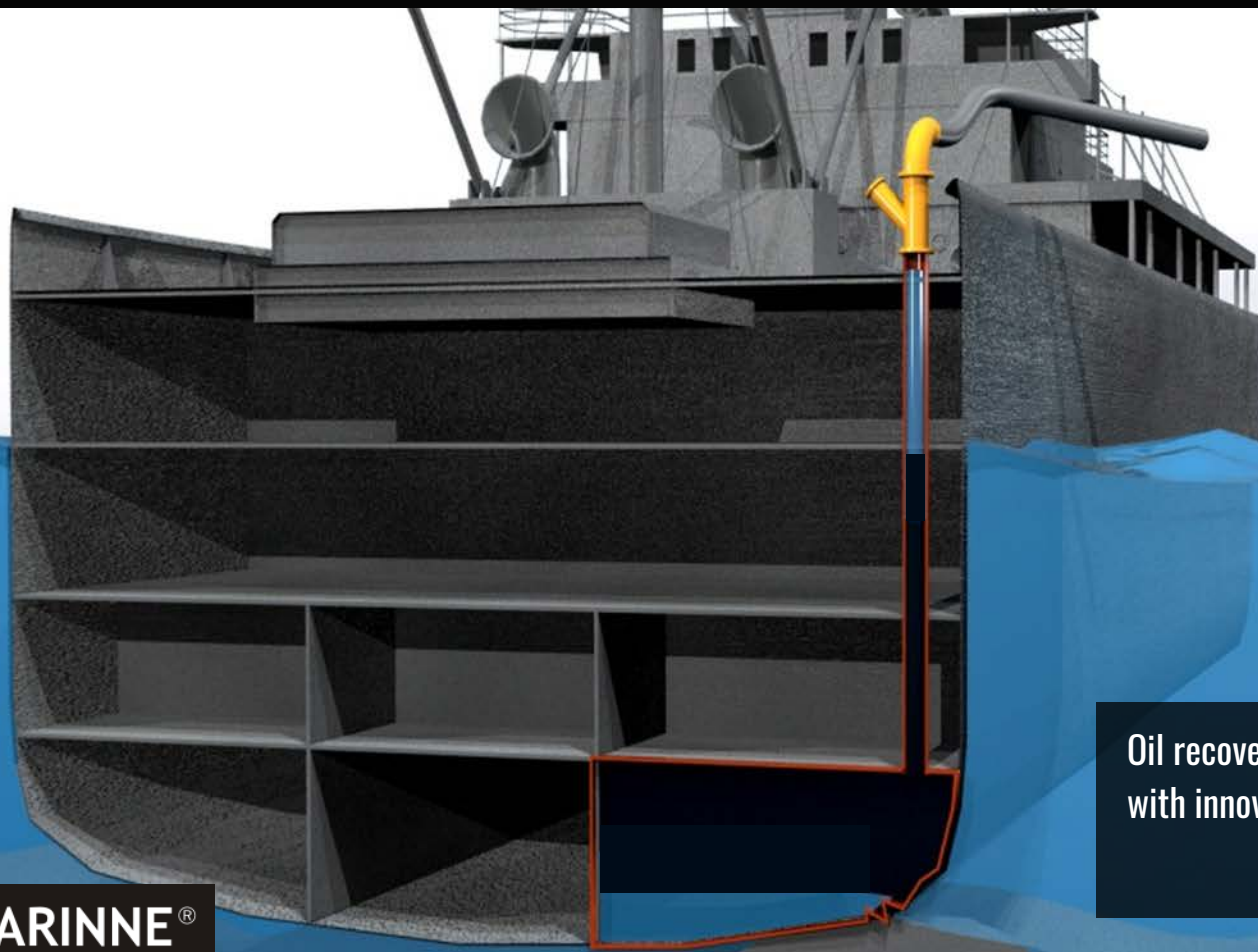
In to 3,5 days removed 374 tons of Heavy Fuel Oil and diesel oil by innovative vacuum and viscosity control technology.



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Oil Removal operation MS Pamisos



Oil recovery technology for damaged fuel tanks
with innovative vacuum and viscosity control

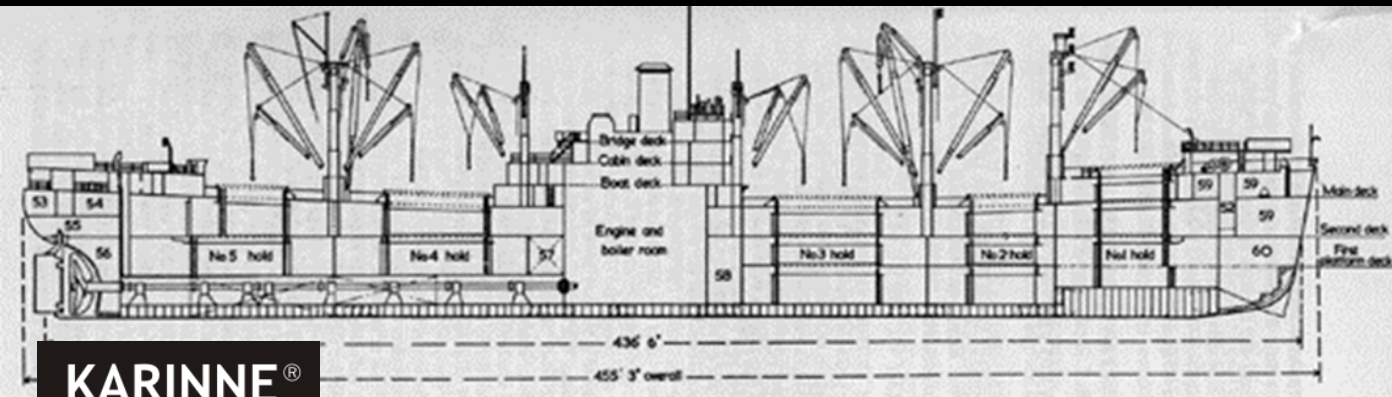
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Case Study

SS Park Victory



**Oil Recovery Operation's working hours 1994-2000;
Oil recovery vessels Halli and Hylje total 5000 h.
Finnish Navy Divers, total 1400 dives and 1200 working hours.
Observation class ROV, 1700 working hours.**

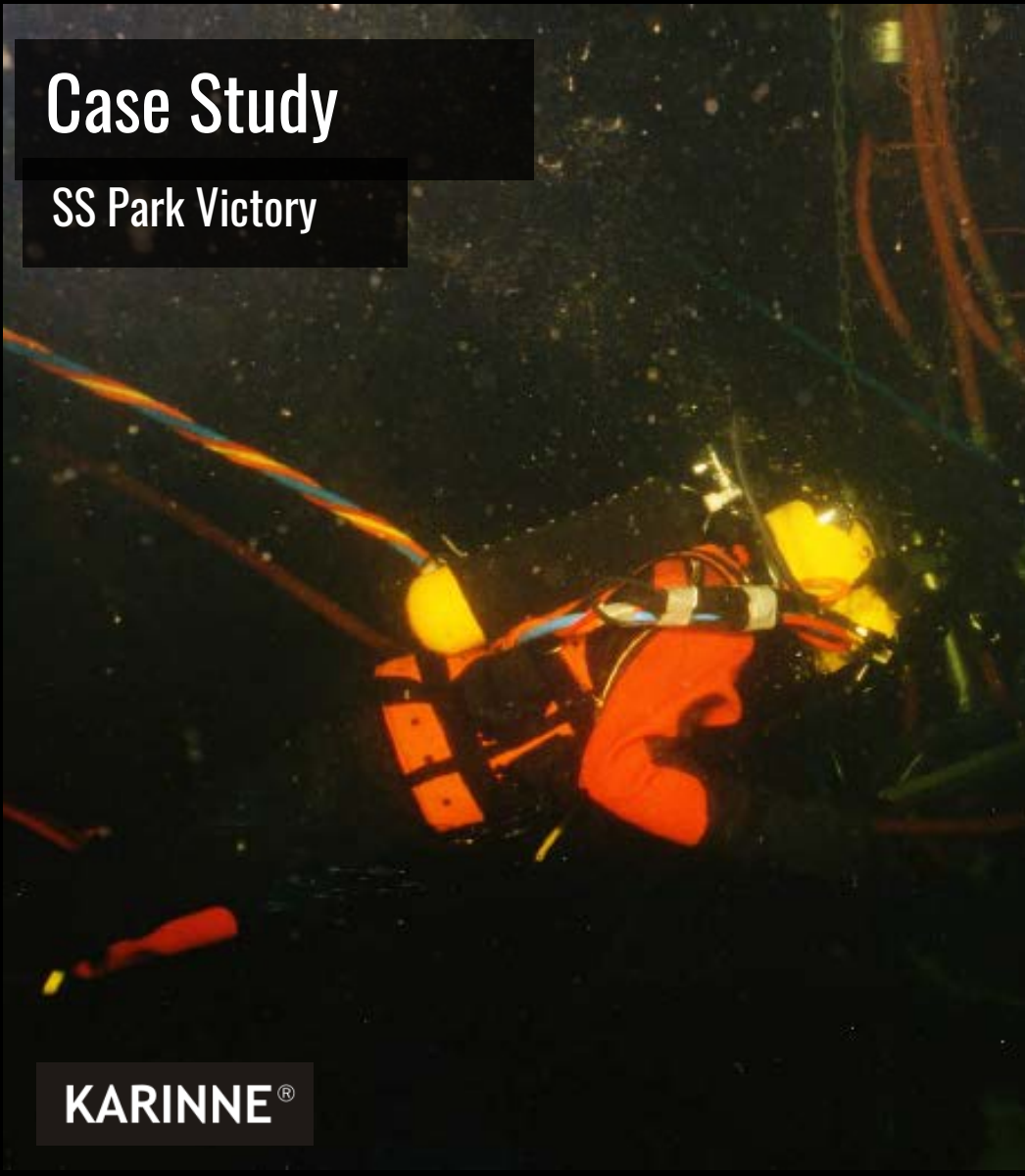


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Syke

Case Study

SS Park Victory



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Syke

Case Study

SS Park Victory

Removed 410 tons of heavy fuel oil from her tanks.



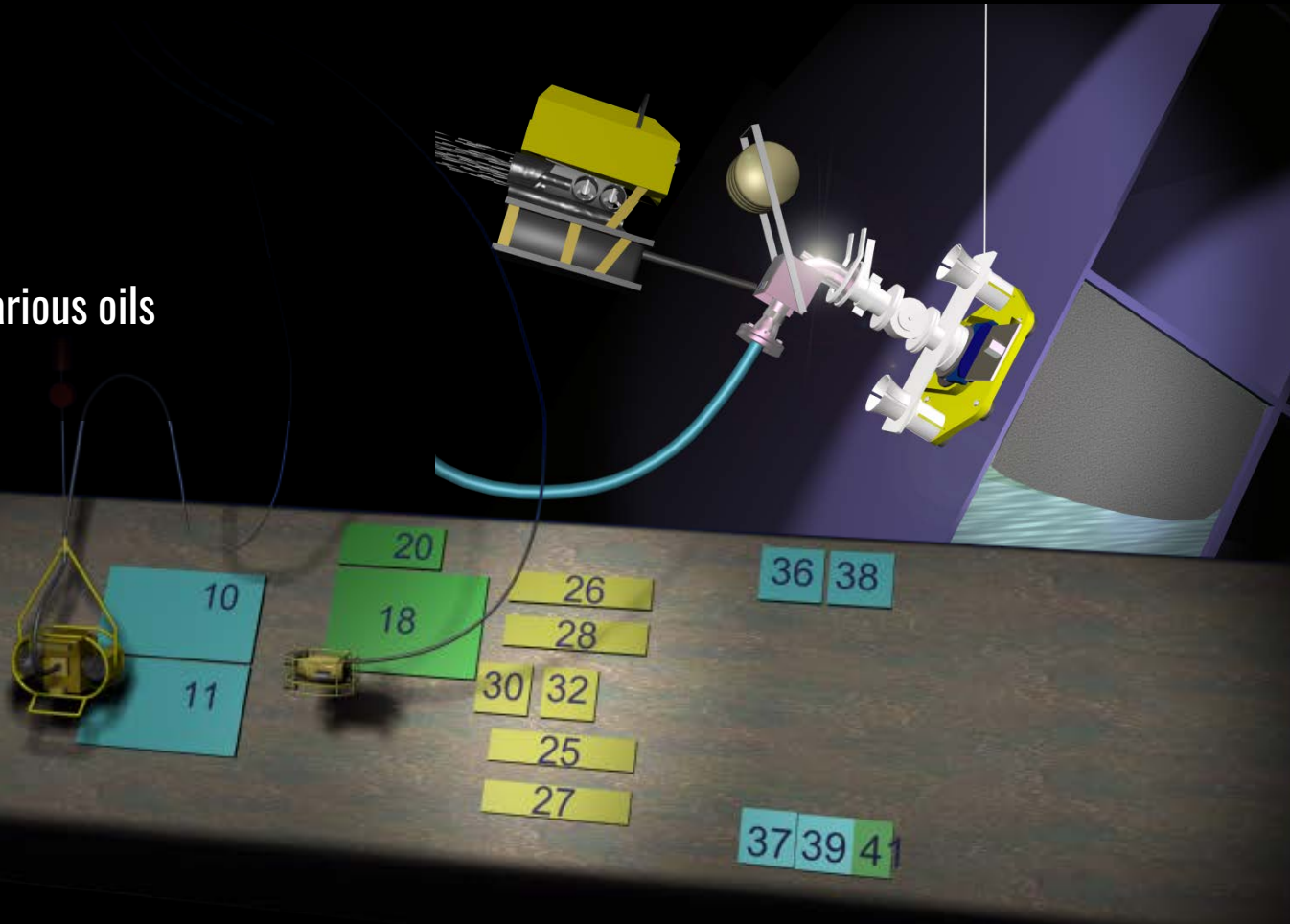
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Syke

Case Study

MS Estonia

230-250 cubic meters of various oils are removed



Case Study

MS Estonia



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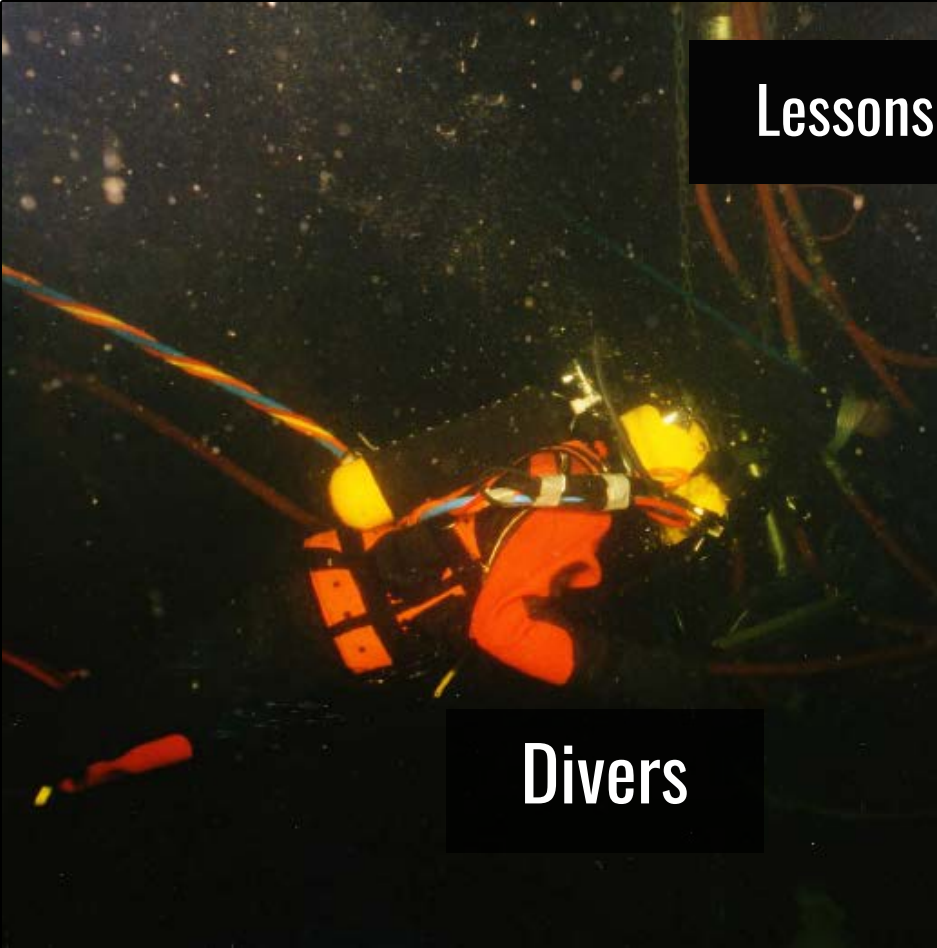
Syke

Lessons learned

Divers

ROVs

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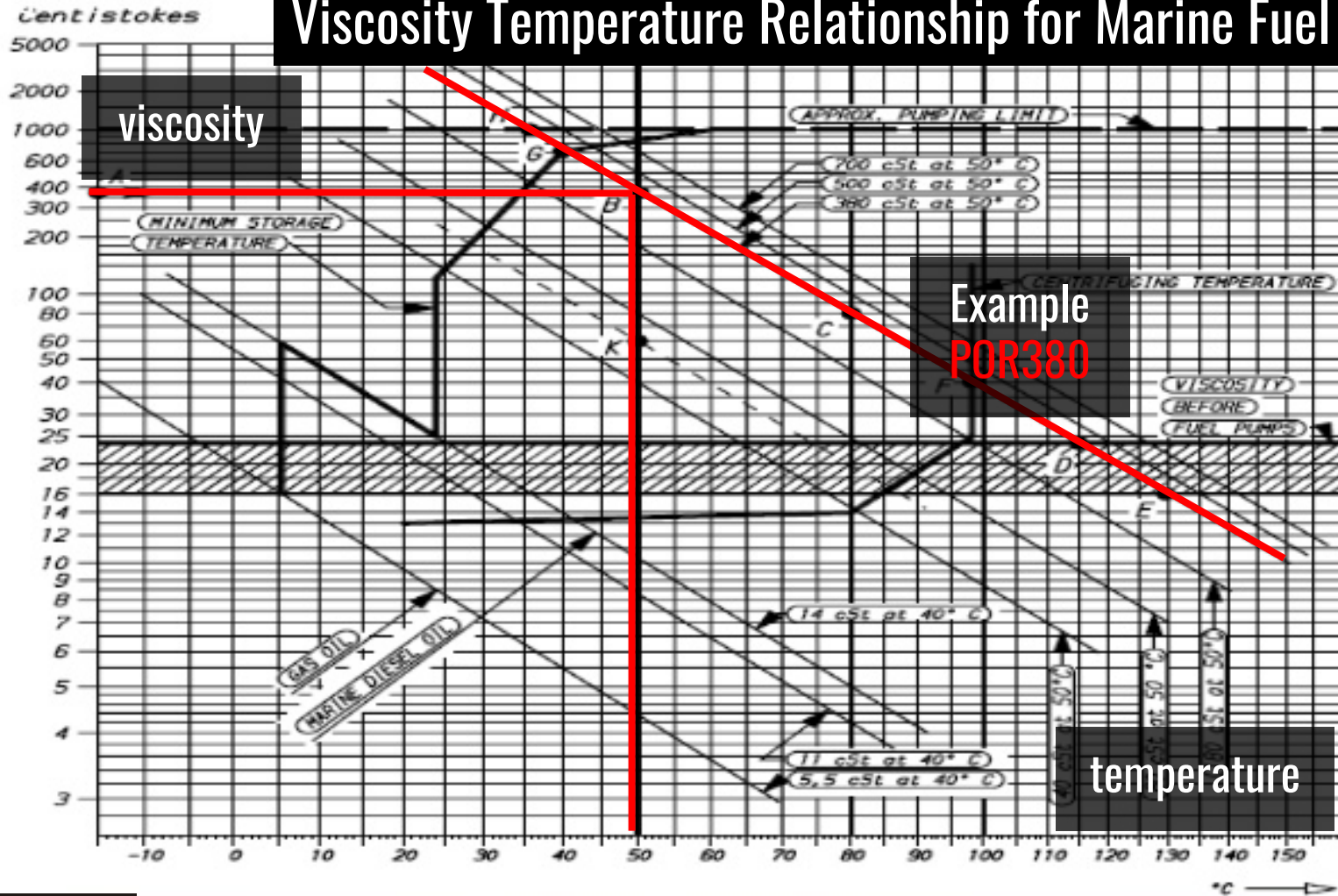
Lessons learned


Pump
systems

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Vacuum
technology

Viscosity Temperature Relationship for Marine Fuel Oil





Oil Removal Operation
from the tank

Lessons learned

Make practical action plan.

Be prepared for surprises and changes.

Have a modular toolbox for different actions.

Know what you are doing. Understand!

Collects a collaborative, multitallent and professional Team.

Test team, equipments and actions before heading to the sea.

Work is interesting and Team spirit is important. Have fun!

Next generation Oil Removal Technology

Toolbox

Future toolbox under R&D, ex.

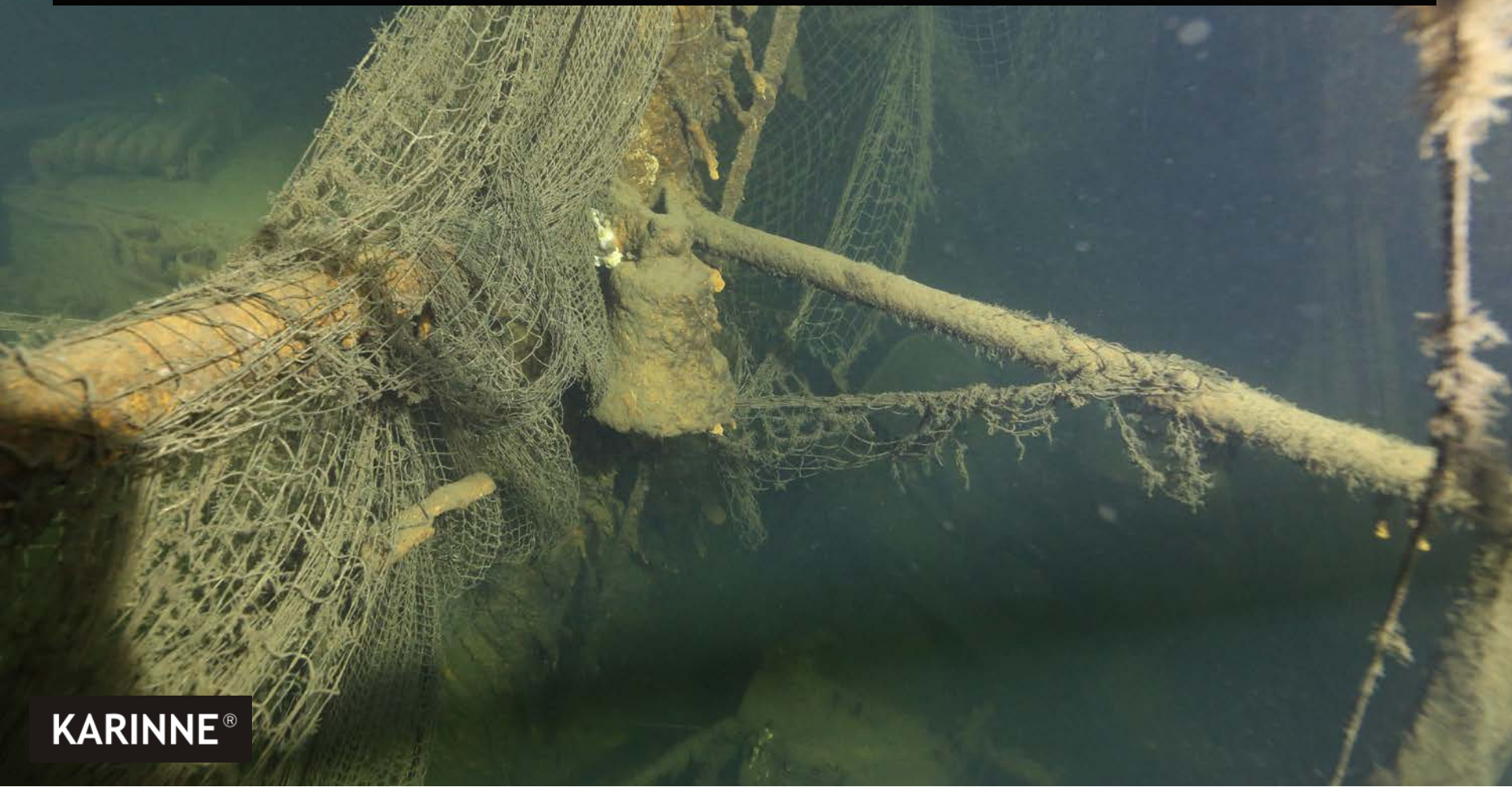
- *Clearing toolset.
- *Surface Cleaning device.
- *Penetration point indicator.
- *PickUp samples from the tank device.
- *Hot tapping device.
- *Intelligent oil removal capacity and oil viscosity control system.

Feasibility Study and operational planning tools

- *Visualization.
- *Digital twin tools helps operations.
- *Action plan animations for training worktasks.

Clear the safe way to the penetration place


Photo Jouni Polkko/Juha "Roope" Flinkman



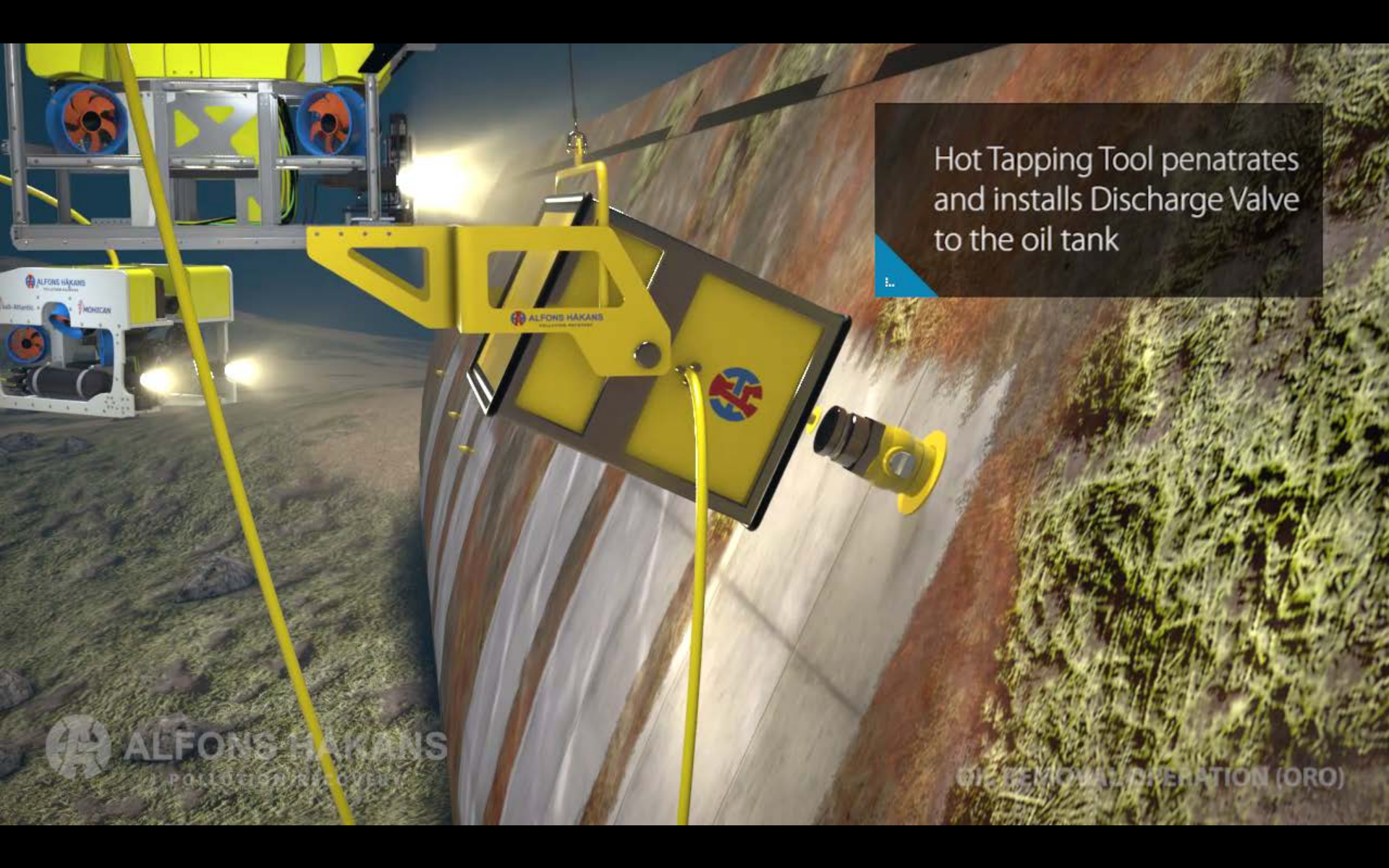
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Inspection on site;
Marking of frame locations
and penetration position

An aerial photograph of an industrial site. A yellow crane is positioned on the left, with a yellow sample valve hanging from it. The valve is positioned over a concrete area. In the background, there is a large, circular structure with a blue and orange fan-like pattern. The ground is a mix of concrete and dirt. The overall scene is brightly lit, suggesting a sunny day.

Inspection on site;
Installation of
sample valve

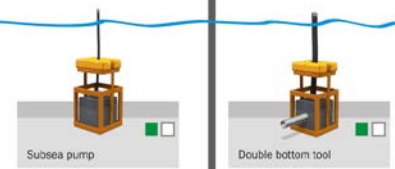


Hot Tapping Tool penetrates
and installs Discharge Valve
to the oil tank

Subsea ORO Toolbox



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Thank You - Have fun!

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