



MARINE PROTECTION

DISPOSAL MODULES FOR EXPLOSIVE ORDNANCE

ENVIRONMENTALLY FRIENDLY – TIMELY

ENVIRONMENTALLY SOUND SALVAGE AND DISPOSAL OF WORLD WAR II ORDNANCE

The North Sea and Baltic Sea is littered with unexploded ordnance from World War 1 and 2, and even the years after the last war.

Millions of tonnes of ammunition no longer needed were dumped in the world's oceans after the end of the two world wars. This was considered a cost efficient method, at the time. In addition, a considerable amount of ordnance, such as torpedoes, sea mines, artillery shells, depth charges ended up in the seas during combat operations.

explosives or chemical ordnance fillings are severely damaged by corrosion causing increased release of contents into the environment. These carcinogenic substances will end up in the human food chain through ingestion via fish and shellfish. They pose significant risks to the environment and the ecosystem.



It is estimated about 1.6 million tonnes of conventional and chemical ordnance in German coastal waters alone according to archival records. The dumped ammunition has entered a state of increased instability. The containers and casings of

Once-stable ignition systems and active substances are gradually becoming more volatile from ageing and corrosion. Urgent action is needed as the condition keeps deteriorating and makes recovery and disposal much more challenging.



FULL EXPERTISE IN OPERATION OF OFFSHORE EQUIPMENT AND DESTRUCTION OF AMMUNITIONS

RHEINMETALL AG

Rheinmetall has been involved in the field of ammunition and explosives for more than 130 years. Founded in 1889 as “Rheinische Metallwaren- und Maschinenbaufabrik AG”, publicly traded Rheinmetall AG is an integrated technology group for a strong, internationally successful company active on various markets with an innovative range of products and services. With about 25,000 employees in 133 locations and production facilities worldwide, Rheinmetall generated sales of €5.7 billion in 2021.

WILHELMSSEN GROUP

Wilhelmsen Group, headquartered in Norway, has more than 160 years of experience in shipping as well as in the maritime sector. It is one of the world’s leading logistics providers for offshore services in the oil and gas industry today, including operation of vessels, platforms, and development for further expansion of renewable energies.

Together with the Wilhelmsen Group, Rheinmetall is in a position to map the entire process chain of salvage, inspection, and environmentally compatible disposal of ordnance under water.

The group combines expertise and power for an innovative implementation of industrialised underwater ammunitions recovery and environmental friendly disposal.

MODULAR APPROACH

The industrial concept comprises modular use of already-developed and recognized components, as well as further development of special tools for processing ordnance in the different stages of disintegration or risk groups.

The advantage is a combination of reliable offshore technology with existing land-based destruction components without the need to develop new floating modules.

AMMUNITIONS DISPOSAL MODULE – EMMA

An existing offshore platform combined with an existing ammunitions disposal facility will be at the heart of EMMA.

In contrast to comparable concepts, we aim to break down the larger explosives in appropriate sizes underwater at a safe distance. Then the parts will be brought to the platform for disposal ensuring risk is minimized. Some parts may even be disposed under water.

SALVAGING AND CLASSIFICATION

Clear identification is required to assess the type and size of the respective ordnance and the associated classification of the risk. Available technologies from the oil and gas industry are adapted or modified for this purpose.





CUSTOMISATION

Ordnance that does not exceed the permissible net explosive quantity of the disposal facility, such as artillery shells, ammunition boxes, weapons, and ammunition parts, will be moved to the disposal facility directly, to be disposed of in an environmentally sound manner.

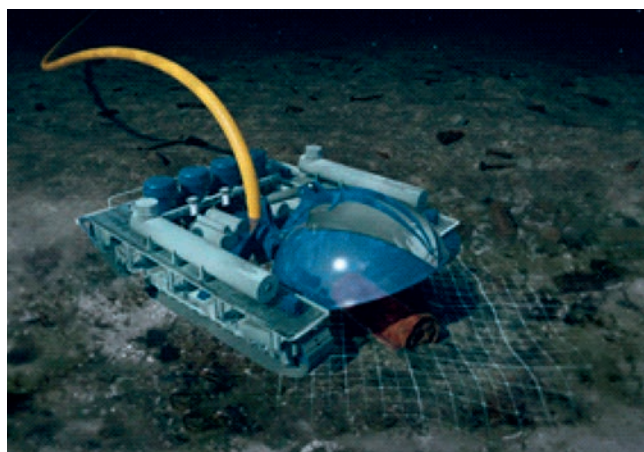
Large explosive ordnance, such as naval mines, torpedoes, aerial bombs, and depth charges, will be disassembled into the corresponding sizes by a module for delaboration. The individual parts will then be moved to disposal.

IN SITU BLASTING

Explosive ordnance that cannot be transported will normally be disassembled on site, thereby significantly reducing net explosive content. This method ensures that the majority of the explosives can be moved to disposal.

Any remnants and ignition systems will be destroyed by detonation on site. This is done using a corresponding module to protect the needs for sound and pressure decoupling from the environment and prevent contamination in the water and seabed.

Remnants, such as scrap metal, will be disposed of once this process is complete. Scrap metal will normally be sent for recycling.



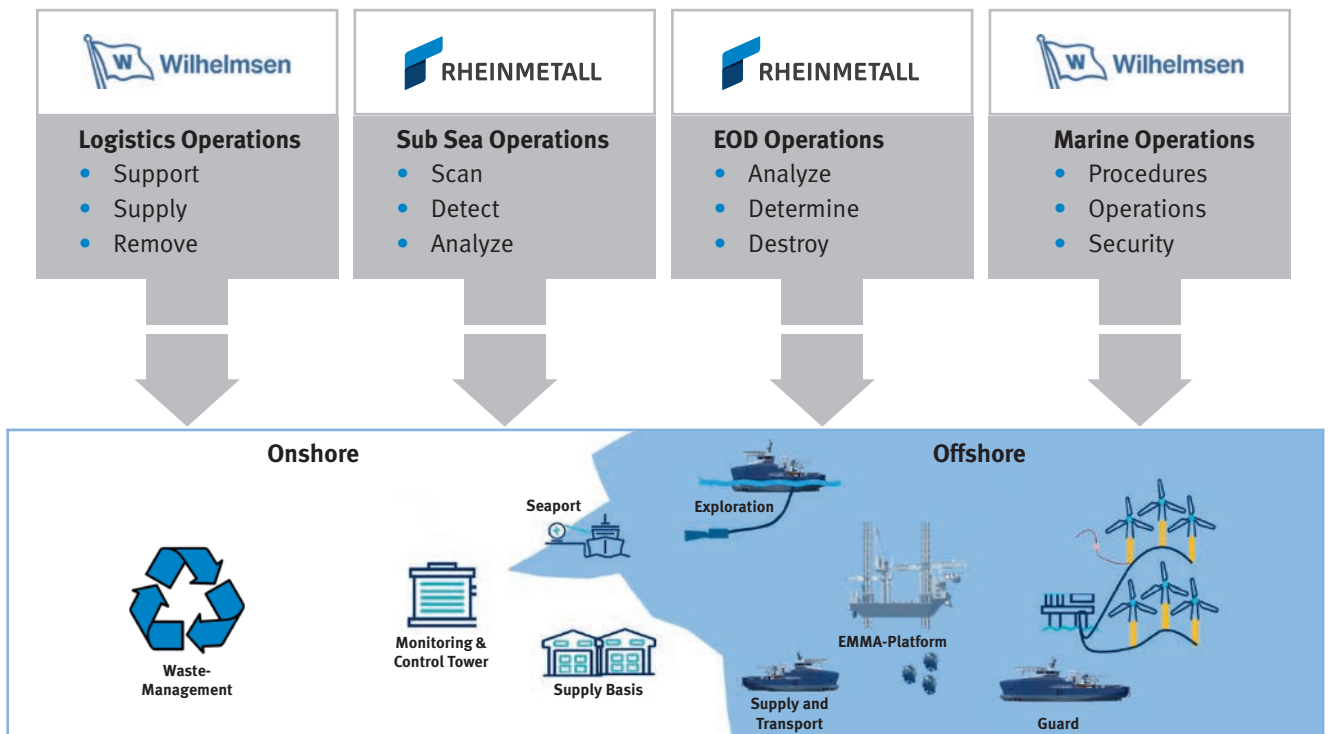
PROCESS CHAIN

The process chain aims to maximize economic utilization of EMMA. The decisive advantage of modularity is the option of scaling individual modules to optimally adapt disposal processes to the task.

The recovery and disposal of explosive ordnance from dumping areas significantly differs from those from project finds of current renewable energy recovery projects, such as the construction of wind farms or the laying of submarine cables.

Our design can also be made available for other explosive ordnance recovered by individual coastal states may have, thus making optimal utilisation of our platform and increasing the total disposal for the subject nation.

In order to have an optimal utilisation of the platform, we may also be able to offer disposal of other ordnances recovered by the individual coastal states with limited permanent disposal capacity.



Process chain from surveillance to disposal

Rheinmetall AG
Rheinmetall Platz 1
40476 Düsseldorf, Germany
www.rheinmetall.com