

Specialist Press Release

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“Vertical Approach” in deep-sea mining: BAUER Maschinen GmbH and the Harren & Partner Group establish joint venture

Schrobenhausen, Germany – Seafloor massive sulfides are a valuable mineral raw material found at the bottom of the deep sea. The “Vertical Approach” is a method for extracting seafloor massive sulfides using the trench cutter method, an established technique in specialist foundation engineering that is operated and supported in the deep-sea environment from a ship on the open sea. As a relatively small-scale intervention with a minimal ecological footprint, this approach is an ideal method for test mining and exploration of deposits up to a depth of 3,000 m.

The approach was conceived in discussions between BAUER Maschinen GmbH and the Harren & Partner Group concerning opportunities to combine the expertise of both companies and to develop new strategies for sustainable mining approaches in accordance with the standards of the International Seabed Authority (ISA).

On August 26, a joint venture agreement was signed between the two companies and Seabed Mineral Services GmbH was established. The first stage is to determine the economic viability and, in particular, the environmental compatibility of the “Vertical Approach.”

“We are thrilled to have found an expert partner in Bauer who is willing – just like us – to seize opportunities and take on a pioneering role in the field of deep-sea mining. Our joint approach for this venture is based on a combination of established technologies. This enables us to minimize the technological risk while at the same time keeping costs down,” says Heiko Felderhoff, Managing Director of Harren & Partner.

Leonhard Weixler, head of the Diaphragm Wall Equipment division at BAUER Maschinen GmbH, adds: “The chemistry between us is very good; we share a similar spirit. This partnership is an ideal union of specialist knowledge and experience in the field of offshore technologies and services with expertise in the development and production of specialist foundation engineering equipment for onshore and offshore customers around the world.”

Heiko Felderhoff and Leonhard Weixler act as Managing Directors of Seabed Mineral Services GmbH.

The concept behind the “Vertical Approach”

Deep-sea sampling undeniably has an impact on sensitive deep-sea ecosystems. Nevertheless, the “Vertical Approach” makes the utmost effort to minimize the ecological footprint. A serious concern when it comes to deep-sea mining is the stirring

up of sediment and the potential impact on sensitive deep-sea species. To prevent fine material from escaping the cutting area, a protective collar is positioned around the cutting wheels at the start and the actual cutting process is protected by the surrounding ore. As a result, fine material from the cutting process remains within this area, while the water mixed with fine sediment and cutting chips is pumped into the ore container.

The separation process is carried out within the ore container to separate the particles from the sea water via sedimentation. After this treatment, the water is fed back to the cutting wheels and reused in the cutting circuit. This closed system minimizes the volume of sea water that is impacted by the cutting process.

Sampling is selective: the template and trench cutter are lowered using a cable winch instead of being initially positioned then moved horizontally along the seafloor. This restricts the sphere of influence to the base area of the template feet and trench cutter. Zones with ore can be clearly separated from zones without ore.

Another aspect of the “Vertical Approach” that reduces the environmental impact of this method compared to other methods is that only one “tool” is used for extracting material. The soil does not need to be crushed later for transport to the ship. Only the raw material is extracted, with minimal impact on the environment.

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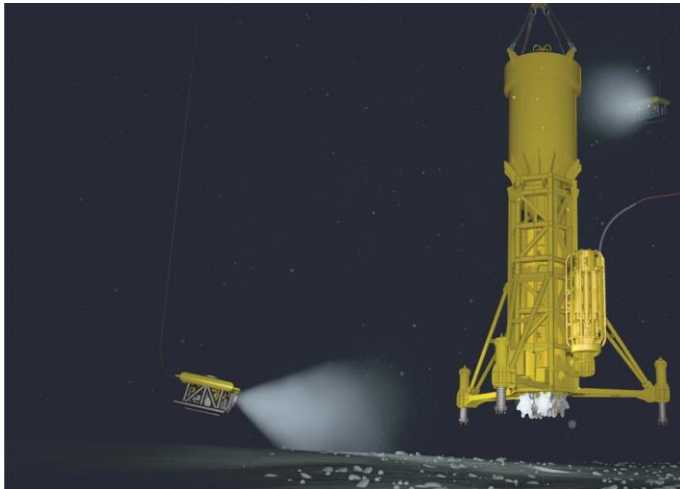
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Images: 2021-09_Joint+Venture+Bauer+Harren ...



(1) From left: Matthias Mueller, Legal Counsel at Harren & Partner, Leonhard Weixler and Heiko Felderhoff, both Managing Directors of the new Seabed Mineral Services GmbH, Verena Schreiner, Product Manager Maritime Technologies at BAUER Maschinen GmbH, Dr. Ruediger Kaub, Chairman of the Management Board of BAUER Maschinen GmbH and René Gudjons, Managing Director of BAUER Maschinen GmbH.



(2) In the "Vertical Approach", the template and diaphragm wall cutter are lowered via a winch instead of being placed once and then moved horizontally along the seafloor.

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About Harren & Partner

The Harren name is synonymous with over 30 years of experience and expertise in the ever-changing world of shipping. The shipping group was founded by Captain Peter Harren in Bremen in 1989 and employs around 270 people ashore and about 2,900 crew members. Today, the privately owned business is a diverse group of companies with 20 oversea offices and strong brands: SAL Heavy Lift, Jumbo-SAL-Alliance, SAL Engineering, SAL Renewables and Intermarine are five of the world's leading companies in the maritime transport sector for heavy lift, wind and project cargo. Combi Lift is specialised in multimodal door-to-door and turnkey forwarding concepts, while Harren Tankers and Harren Bulkers are responsible for the commercial and technical management activities for the group's tankers and bulkers fleet. Another core activity involves offering high quality ship management services to in-house and international third-party clients. The fleet currently consists of 85 units – heavy lift carriers, bulkers, tankers, dock ships, container vessels, tugs, barges and offshore vessels. With specialised teams for the different types of ships and strong shipping DNA in its business culture, Harren & Partner guarantees the highest standards of quality – both ashore and at sea. For more information about Harren & Partner, go to www.harren-partner.de

About BAUER Maschinen Group

For almost 60 years, equipment from Bauer has represented the highest performance and quality and constant innovation. The BAUER Maschinen Group is the world market leader in the development and manufacture of specialist foundation engineering equipment. BAUER Maschinen GmbH, which is also the holding company for a number of subsidiaries, designs and builds large-diameter drilling rigs, duty-cycle cranes, trench cutters, grabs and vibrators as well as the related tooling at its plants in Schrobenhausen, Aresing and Edelshausen. The subsidiaries manufacture state-of-the-art mixing and separation equipment as well as rotary drive systems and equipment for drilling small-diameter boreholes and wells. The BAUER Maschinen Group also operates manufacturing facilities in the USA, Russia, China, Malaysia, Italy, Singapore and Turkey. Component suppliers within the Group are Schachtbau Nordhausen and Olbersdorfer Guß. The company operates a global sales and service network. More at bma.bauer.de

About Bauer

The BAUER Group is a leading provider of services, equipment and products dealing with ground and groundwater. With over 110 subsidiaries, Bauer can rely on a worldwide network on all continents. The Group's operations are divided into three forward-looking segments with high synergy potential: Construction, Equipment and Resources. Bauer profits enormously from the collaboration of its three business segments, enabling the Group to position itself as an innovative, highly specialized provider of products and services for demanding projects in specialist foundation engineering and related markets. Bauer therefore offers suitable solutions to the world's greatest challenges, such as urbanization, the growing infrastructure needs, the environment, as well as water, oil and gas. The BAUER Group was founded in 1790 and is based in Schrobenhausen, Bavaria. In 2020, it employed about 11,000 people in around 70 countries and achieved total



Group revenues of EUR 1.5 billion. BAUER Aktiengesellschaft is listed in the Prime Standard of the German Stock Exchange. More information can be found at www.bauer.de. Follow us on [Facebook](#), [LinkedIn](#) and [YouTube](#)!