Press Release

Graebener supplies Haizea Wind Group with innovative milling technology for weld seam preparation for the new monopile production facility

With the expansion at the production site in Bilbao, Haizea is making the port one of the most important locations in southern Europe for the construction of offshore wind towers and their foundation structures (monopiles)

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Germany/Spain. Haizea Wind Group (Haizea), which was founded in 2017, has been working with Graebener right from the start. In 2018 Graebener already supplied a 55kW longitudinal seam milling machine and two 55kW circumferential seam milling machines for Haizea's wind tower production in Bilbao. Haizea is now entering the monopile market and is once again relying on two further milling machines for weld seam preparation from the custom machine builder from Germany - this time with a recently developed pipe turning device for turning and positioning cylindrical and conical pipes, which is used to align the pipes above the longitudinal seam milling machine for seam processing. The pipe weight can be up to 125 tons.

Haizea is a global player in the onshore and offshore industry. The company has been manufacturing giant wind towers in the port of Bilbao since 2018. By entering into monopile production, the company is expanding this facility by adding another hall segment. Production is scheduled to start in the second quarter of this year.

Graebener supplied a 55kW longitudinal seam milling machine including an innovative pipe turning device, which is designed for turning and positioning cones. The scope of supply further includes a 55kW circumferential seam milling machine with a special height adapter and a substructure that enables the circ seam milling machine to be positioned and aligned quickly to the circumferential seams of the monopile sections to be processed by means of a self-propelled modular transporter (SPMT). The machines are designed to prepare the connecting seams of the huge cones and cylinders that make up the monopiles for the submerged arc welding process.

Monopiles, in turn, are foundations for offshore wind farms - large steel columns with a wall thickness of up to 150mm, diameters of up to 15m, lengths of up to 100m and unit weights of up to 2,500t.

Optimum conditions for economical weld seam preparation with large wall thicknesses

Monopiles consist of a large number of steel rings (pipe sections) that are welded together. Due to their huge diameters of up to 15m, the sections are made from several individual plates. This production method results in both longitudinal and circumferential seams: Longitudinal seams during the production of the shells, circumferential seams when joining the sections together. Both inside and outside edges must be precisely beveled prior to welding the individual parts together. The more precise the bevels, the more resilient the weld seams and therefore the complete monopile will be.

The Graebener seam milling process provides a uniform joint width and depth over the entire circumference of the pipe. Further, the precisely milled joints allow an uncomplicated visual inspection of the internal root of the weld seam without prior cleaning, enabling the quality of the internal weld seam to be visually inspected directly. This means that weld seam defects can be reduced to 0%. Last but not least, automatic seam preparation is a necessary requirement for an automatic multi-wire submerged arc welding process, given the fact that the seam detection sensor requires clean joint edges.

Another advantage of Graebener seam milling machines is the cost savings of at least 62% compared to conventional methods such as carbon-rod joints or grinding. The reason for this is the geometry of the milled seam preparation: the much smaller joint width - a milled joint has an opening angle of 16°, whereas a conventional joint has an opening angle of approx. 60° - results in less heat input, less welding material being used, energy being saved, and the welding time being significantly reduced. Furthermore, at up to 1.2 m/minute, mechanical milling is ten times faster than conventional processes.

Efficient handling of large diameter cones

Graebener is the global market leader with its circumferential and longitudinal seam milling machines for many years. Both types of machines are able to process large pipe diameters with very thick material. Haizea is receiving two further developments:

One special feature is the innovation developed by Graebener in 2022 for its longitudinal seam milling machines: the integrated pipe turning device, which allows even conical pipe sections to be positioned more securely without crane handling and without lateral drift. On a milling machine, each longitudinal seam of a pipe section (up to three pieces depending on the diameter) have to be rotated into an exact 6 o'clock milling position for processing. This is usually achieved by means of cranes. However, an integrated device facilitates the positioning of the pipe sections significantly, allowing the turning process to be carried out with considerable time savings. Using the turning device, the cylindrical and conical sections are safely lifted, turned and lowered in a defined manner - even sections with very large diameters, cone angles of up to 6° and a unit weight of up to 150 tons.
As turning conical pipe sections geometrically causes a drift in the longitudinal direction of the pipe, Graebener has developed special rollers that turn the pipe section and prevent the longitudinal drift altogether. The rollers are positioned by means of electromotive servo drives so that the conical pipe sections only roll on the largest and smallest pipe diameters on the surface line. The rotation speeds are automatically adjusted to prevent drift in the longitudinal direction of the pipe.

The second innovation - a special height adapter - enables the customer to process pipe diameters of very different sizes on the circumferential seam milling machine. To assemble sections of cylindrical and conical sections, these have to be positioned on a constant horizontal center line. As a result, the different diameters of the cones cause different working heights for the circ seam milling machine. With a specially developed adapter, the milling machine can be positioned at two different heights on the pipe sections. A substructure placed underneath allows the milling machine including adapter to be moved with the help of a self-propelled modular transporter.

Just like over 200 customers from the vessel, large-diameter pipe, wind and offshore sectors worldwide, Haizea Wind Group has been relying on the proven Graebener technology for years. With these new machines, the company is equipped for future monopile production.

Number of characters (with spaces): 6,401

Pictures and caption


Bild1.jpg, Bild2.jpg

The Graebener longitudinal seam milling machine is used to prepare weld seams on monopile pipe sections with very large diameters, cone angles of up to 6° and a unit weight of up to 150 tons.

Bild3.jpg

Thanks to the height adapter, sections with pipe diameters of 6 to 12m can be processed with the 55kW circumferential seam milling machine.

Boilerplate

Graebener® is a medium-sized, family owned machine building company with locations in Netphen (Germany) and Houston (USA) as well as a variety of international representatives. Based on more than 100 years of experience in the metal processing business we develop and realize customized

solutions for the core markets of automotive industries, hydroforming, manufacturing of large pipes, shipbuilding, wind tower production, vessel construction and hydrogen.

Our product range includes hydraulic forming machines, milling and bending machines, calibration and straightening presses as well panel production lines. In addition, we have been one of the first companies to focus on the research and development of manufacturing processes and machines for fuel cell and electrolyzer components, such as metallic bipolar plates. With our business unit Graebener® Bipolar Plate Technologies, we have dedicated ourselves to setting the quality standard for these manufacturing technologies. To achieve this, we develop innovative processes that help to manufacture components for hydrogen-based energy generation that are tailor-made, integrable, scalable and thus economically efficient.

Graebener® stands for a holistic approach. We are a technology and equipment partner and accompany our customers along the entire process chain – from the initial idea, comprehensive engineering (including hydraulics, automation and control technology as well as intelligent Industry 4.0 applications) up to customized new machines or retrofitted existing ones.

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