

PEMAMEK CUSTOMER MAGAZINE 2023

PEMA NEWS



TECHNOLOGY

Offshore wind advances toward welding automation

CUSTOMER STORY

Lamprell expands offshore wind capabilities with PEMA welding automation

IN THE SPOTLIGHT

Creating meaningful connections & competitive edge

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PEMAMEK Ltd.

Cover Olli Vesterinen

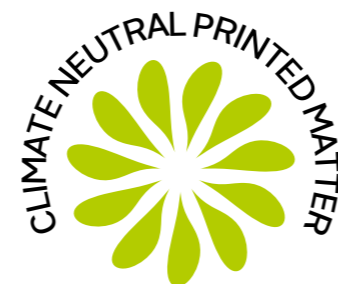
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◀ Juha Mäkitalo, CEO Pemamek Ltd.

Sustained success

At Pemamek we have had an exciting start to 2023. Significant efforts to develop new solutions have been made and this has resulted in the company's strong growth. The main factors behind the made developments are global megatrends, such as increasing demand for green energy and the shortage of skilled workforce.

During the past 1,5 years, we have hired almost one hundred new team members. Furthermore, since the beginning of January 2023, we have been able to enjoy the latest expansion of our factory totaling an impressive 7,000 square meters. Next, we are looking forward to celebrating the official inauguration in June under the Finnish midnight sun together with our biggest enablers: customers, partners, and our own PEMA people.

We're also continuing to expand and strengthen our global presence. Following the successful openings of Pemamek Germany and Pemamek Spain, we're thrilled to announce that Pemamek Italy is also fully operational. Plans for the next steps in the future are in place and will follow soonest.

As our company continues to grow, we recognize our increasing impact on society and the environment. For Pemamek, as a family company, acting responsibly has always been a core value. Thus, we launched a new responsibility initiative in late 2022 and released our first responsibility report in summer 2023. We're committed to taking positive steps toward a sustainable future and are excited to share our progress with you.

The initiative has also prepared us well for the upcoming CSRD reporting directive. In addition, we have developed a Code of Conduct to communicate our values and establish guidelines for our company culture amidst our rapid growth.

Each company has its own unique strengths that contribute to its competitiveness and success. In this year's PEMA News, we are proud to highlight some of our own strengths, commitment to putting customers first, pioneering welding automation, and team fueled by the PEMA spirit, among others.

We hope you enjoy reading it!

Sincerely,
Juha



▲ Jaakko Heikonen, Vice Chairman of the Board, Pemamek

XXXL wind turbines and monopiles shaping wind industry

The offshore wind industry is gaining significant momentum, with giant wind turbines and monopiles becoming the game-changers in the renewable energy sector. Offshore wind energy offers potential for clean electricity generation, and the use of larger turbines and monopiles is driving its rapid growth.

Massive wind turbines are now being deployed offshore, harnessing the powerful winds found in open water to generate electricity at a massive scale. As the need for more powerful offshore wind turbines grows, the demand for stronger foundations increases with it. Monopiles, the foundations for offshore wind turbines, have also evolved in size and design. Modern XXXL monopiles can exceed 100 meters in length and up to 15 meters in diameter, capable of supporting the weight and size of huge turbines.

To succeed in manufacturing and in the offshore wind industry, deep technical knowledge, strong expertise, and collaboration are needed. PEMA automation technology is highly capable in terms of production efficiency and quality for extremely large monopiles.

"Pemamek has lately published two major contracts with leading suppliers from the wind energy industry, Sif and Haizea. The contracts are a strong indicator of Pemamek's position as the leading production automation provider for the offshore wind industry," tells Jaakko Heikonen, Vice Chairman of the Board & Director, Global Sales and Marketing, and continues:

"We look forward to continuing working together with other industry professionals, leveraging the latest advancements in XXXL wind turbines and monopiles, to excel in the wind energy business and contribute to a more sustainable future. The offshore wind industry presents great opportunities for growth and innovation. Together with our partners and customers we can push the boundaries and make a lasting impact towards safer, more efficient, and reliable wind power solutions."



▲ Pemamek received the Occupational Health & Safety certificate in November 2022.

Pemamek becomes ISO45001 certified

Pemamek has received the Occupational Health & Safety certificate, ISO45001. By implementing the standard Pemamek is dedicated to protecting the safety and health of its people, but also to improving its safety performance.

ISO45001 is an international standard that defines international requirements for an Occupational Health & Safety (OHS) management system. The certification provides a framework for organizations to analyze and manage potential work-related risks and injuries.

At Pemamek the systematic process to obtain the ISO45001 was started in late 2021. Throughout the process also GAP assessment was completed to identify possible deviations and map the regulatory landscape. Pemamek's partner throughout the certification journey has been DNV.

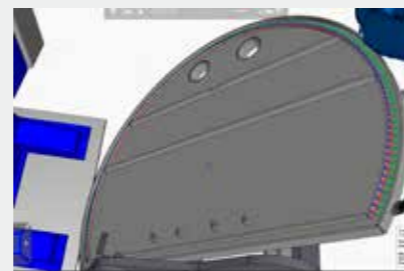
PEMA WeldDesigner: Smart tool for automatic weld path creation

Pemamek has introduced a powerful programming feature with breakthrough weld path creation capabilities. The smart tool enables an automated path generation for the welding robot.

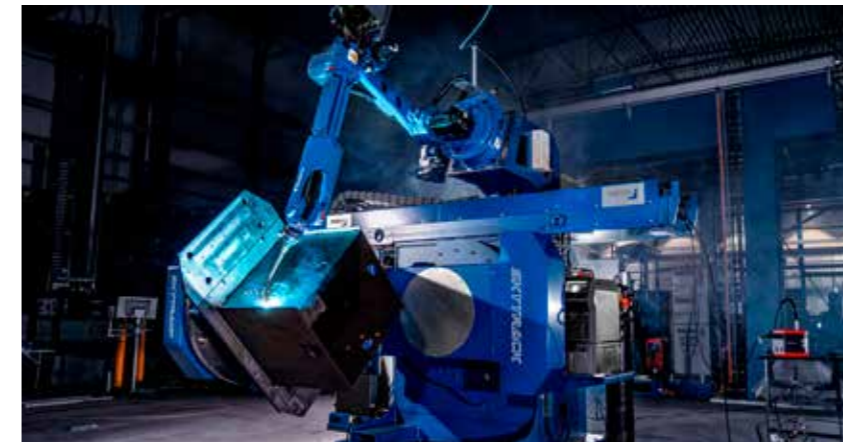
The software requires a 3D model of the product suitable for a simulation environment. The operator selects parts to be joined together and defines the used weld parameter set. The only task for the operator is to point to the weld path target with the mouse. Once the paths are created, the simulation is performed to ensure a safe operation.

The entire path creation process can be completed next to the robot or by the office desk. The visual and straightforward interface design ensures an easy approach to programming making it fast, simple, and efficient.

PEMA WeldDesigner is available in the latest software updates for every PEMA customer.



▲ Pemamek's new PEMA WeldDesigner enables fast and simple path creation for robot welding.



▲ PEMA Skytrack is compact robot welding station with 2-ton handling capacity.

Pemamek introduces PEMA Skytrack

Pemamek has launched a new agile and compact robot welding station, PEMA Skytrack. The solution features a 2-axis PEMA Skyhook Pro positioner, a 6-axis Yaskawa robot welding arm and linear robot track. PEMA Skytrack sets a new standard for compact robot stations with its 2-ton handling capacity and 2600mm (102 in) robot travel length.

The streamlined and sophisticated design occupies a small floor space making it fast to install and move to another location. Thanks to the easy-to-operate approach, the new compact robot welding station is fast to implement and an excellent solution for workshops with and without previous robotic welding experience.

For more information: info@pemamek.com or pemamek.com/pema-skytrack

New milling family for wind tower structures

Pemamek has launched a new family of heavy-duty milling equipment. The selection includes modern milling solutions for longitudinal, circumferential, and edge beveling. While the equipment is designed with the wind energy sector in mind, the milling solutions are also suitable for the process industry, such as pressure vessel manufacturing.

One of the main advancements is the high-tech Direct Drive spindle technology that Pemamek has incorporated into the system together with the German KESSLER. The servo-driven and backlash-free technology offers less vibration and more lifetime for milling inserts. Furthermore, as in each PEMA welding and production automation solution, the efficient process control system and real-time process feedback become standard.



▲ PEMA EB for edge beveling.

"Advantages of the direct drive machining technology were proved already a few years ago in the first machining operations with the KESSLER torque motor technology. I am proud to have been a part of this, and now introduce the machinery with the torque motor, spindle shaft, bearings, and sensors all in the same compact and modular spindle unit, developed in cooperation with Pemamek and Kessler" summarizes Esko Lähti, Product Manager at Pemamek.

Pemamek expands to Italy, appoints Andrea Battaglia as sales director

Pemamek is extending its presence with the launch of Pemamek S.r.l. in Italy. As part of the growth strategy, Pemamek has appointed Andrea Battaglia as Sales Director to oversee operations and sales in Italy.

"We are excited to have Andrea join Pemamek's global team. He has a long experience in the manufacturing industry and has a profound knowledge of the Italian markets, too. Strengthening our presence in selected areas and being close to our customers is essential to our long-term business strategy," says Juha Mäkitalo, CEO of Pemamek Ltd.

With his industry expertise, Battaglia will focus on expanding Pemamek's customer base and driving future growth in the market. The move aligns with the increasing demand for production automation in the country. Pemamek aims to strengthen its local support and service network and develop its partner and agent relationships.



▲ Andrea Battaglia, Sales Director, Pemamek Italy.

Text Pihla Ruohonen Photos Olli Vesterinen

Offshore wind advances toward welding automation

The market for offshore wind energy grows rapidly resulting in larger diameter foundations and towers. The question for manufacturers is where to acquire the capabilities to produce such massive structures for steepening waters. PEMA News speaks with Pemamek's Wind Sector's Application Manager, Juhani Tuomola on the importance of welding automation to overcome manufacturing challenges.

The offshore wind energy industry is booming, and the current trend is towards building even bigger structures farther out to the sea. With new technology being developed it is possible to put wind turbines far from the shore. The farther out the towers are, the more stable the

wind is which also means more energy. However, the longer the distance from the shore, the harsher the conditions are and the deeper the sea gets. This requires a lot from the offshore wind turbine design, foundation, methods, and of course, manufacturers.



► According to Pemamek's Juhani Tuomola, new technologies for the wind energy industry is developed all the time and the trend is towards even bigger structures.

The wind tower monopiles are approximately 10 m in diameter and they are constantly growing. They can be put in the seabed at the depth of 60 m and serve as the base for wind towers that reach over 300 m into the sky. However, the deep water also creates challenges. As the water gets deeper an alternative solution is offshore wind turbine floating foundations. According to **Juhani Tuomola**, Wind Energy Application Manager at Pemamek, new technology is developed all the time and the trend is towards even bigger structures:

"The offshore wind energy industry is thriving, and the development speed is high. The trend is going towards bigger structures, soon there will be monopiles that are 15 m in diameter and 120 m in length. Floating wind turbines with floating foundations enable us to put the wind towers in places, where it hasn't been possible before. The question is how to build durable foundations that will last in the harsh offshore conditions."

Welding automation to build floating offshore wind turbine foundations

A floating foundation or structure means that the wind tower base is kept in place with help of long cables that are attached to the seafloor. This makes it possible to put wind towers far out, even to the depths of 200-300 m of water. The offshore wind turbine foundation design is different but has similarities to the technical structures that are used in submarines, shipbuilding, oil rigs, and wind tower manufacturing. By combining different PEMA welding automation solutions it's possible to build these huge structures with the preciseness that is needed.

One example of the solution is the modern technology that Pemamek uses that makes it possible to weld the thick and heavy plates together perfectly to last in harsh marine conditions. With semi-narrow grooves time, resources, and energy are saved, and it results in high quality and production capacity. Pemamek's long-stick-out pro-



cess with WeldControl 500 software and laser seam tracking is one of the safest and most efficient ways to weld. With help of the software, all guesswork is eliminated. One operator can do the work of multiple welders and do multiple welds at one time.

Production of offshore wind turbine foundations

Foundations for floating offshore wind turbines can be built in different ways. Three common styles of floating foundation structures are spar, tension leg platform, and semisubmersible. A spar foundation structure can be built by combining different PEMA welding solutions such as an assembly station, flange fitting, PEMA Column & Boom for longitudinal and circular welding, milling machine, and WS2 welding platform.

▲ PEMA welding automation equipment, PEMA WS2 and self-aligning rollerbeds, designed for offshore wind tower manufacturing.

A tension leg platform can be built by using PEMA robotic welding solutions: PEMA VRWP-C and PEMA VRWP-X2. These solutions are often used in robotic welding in the shipbuilding industry. PEMA VRWP-C, for example, has a working width of 5 meters (16 feet) and the length of the working area can be expanded into 6 meters (20 feet) modules.

Semi-submersible foundations are produced with the help of the PEMA node welding station and PEMA pile assembly station. For section assembly and welding, Pemamek can provide for example assembly line, WS2 welding platform, PEMA column and boom, and rollerbeds.■

Text Jyri Luhtio Photos Lauri Paasio, Olli Vesterinen

Adaptive robotic welding in heavy manufacturing

Flexibility and adaptivity have become vital capabilities also in heavy manufacturing. The new enhancements in software and welding automation enable the robot to sense the altering groove geometries bringing new state-of-art dimensions to welding heavy and complex structures.

Shift from manual to adaptive welding

It is fair to say that the world's most adaptive welding system is a professional manual welder. A manual welder has the capability to adapt to variables accordingly and thus, perform needed actions successfully to create high-quality welds even in the most demanding circumstances.

Machinery, automation, and robotics are designed to increase health, safety, and ergonomics and

to increase the cost-effectiveness of welding. The request for improving repeatability, productivity, and constant high quality is increasing globally, automated welding solutions are needed to fulfill those requests. Furthermore, as the trend of lacking skilled manual welders is rapidly spreading and growing all over the world, modern welding machinery is even more desperately needed to perform welding tasks. With welding automation, multiple work phases can be performed flawlessly, repeatedly, and time after time.



▲ Jyri Luhtio, Application Manager, Offshore and Process Equipment

And with the ever-developing technology, adapting to variables in a similar way as a manual welder is possible.

Welding automation solutions that do not have a "sensing" system and smart software to interpret the information, require precise preparations. In some instances, it is not cost-efficient to make prefabrication with such high precision to enable automated welding. This is usually the point where adaptive robotic welding comes into question. With adaptive welding, machinery, and automation can mimic the needed actions the manual welder performs while creating high-quality welds.

Adaptive robotic welding in a nutshell

Automated welding which adapts to weld conditions by controlling welding parameters in real time is called adaptive welding. To describe the development levels, welding automation is typically divided into different stages starting from manual welding and incrementing to adaptive welding. Today, adaptive robotic welding is considered the highest and most sophisticated automation level.

The biggest advantages of adaptive welding are gained when welding geometrically altering grooves on heavy and large products. Thanks to the method's capability to "sense", it enables consistent and flawless welding quality despite the groove changes. Additionally, when automation takes care of both handling and welding, production efficiency and safety are maintained



Production efficiency and safety are maintained high as automation takes care of both workpiece handling and adaptive robotic welding.



Adaptive robotic welding enables flawless welding of, for example, nozzle connections in pressure vessels.

high. Adaptive features enable automated welding to be used for weld joints where preparations are not 100% accurate.

In adaptive welding, the movements and welding parameters are automatically adjusted according to information received from sensors. The sensor type that is commonly used in the manufacturing industry for adaptive welding is the optical

laser sensor. The information, usually the position and geometry of the weld groove, is delivered to the control system. The control system uses this information to adjust the welding equipment and the automated machine moving the torch.

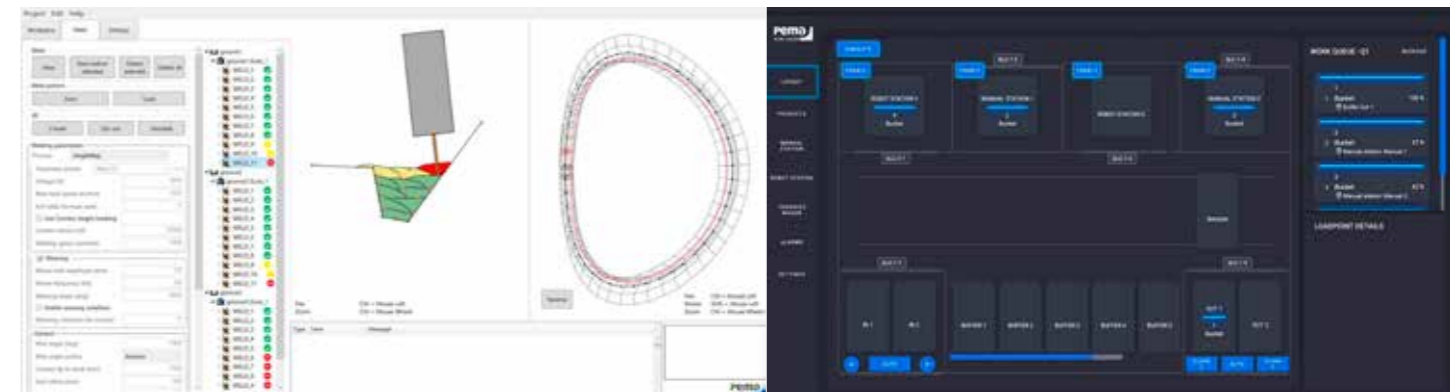
In a robotized adaptive welding application supplied by Pemamek, this means that robot will adjust the welding speed, weaving pa-

rameters, torch location, and torch angle according to the information provided by the sensor & control system.

Multi-pass welding with PEMA WeldControl 300 Scan

At the core of any adaptive welding method are sophisticated software and intelligent sensing system, such as laser scanning. At Pemamek this powerful combination is called **PEMA WeldControl 300 Scan**. Robotized stations equipped with Scan software can produce flawless full penetration welds, e.g., pressure vessel nozzles, wind energy components, large crane components, and mining equipment.

Compared to robots equipped with traditional multi-pass functions, such as a fixed multi-pass weld sequence, Pemamek's Scan's advancements are significantly ahead. After the automated scanning work cycle, the data of the scanned groove is presented in PEMA WeldControl 300 SCAN software. The operator can utilize the library of the existing multi-pass weld sequences for the scanned groove or create a new sequence, which can be saved in the library and applied in the future to similar weld connections. In the Scan software, every single weld pass in the multi-pass weld sequence is adapted to the scanned groove automatically by the software. With these features, the groove is filled evenly despite preparation-caused deviations.▶



▲ As the HMI can do tasks in a more automated way, PEMA WeldControl 300 Scan & adaptive robotic welding could be paired with for example PEMA FMS solutions.

Future developments

For adaptive robotic welding to become a mainstream method in heavy manufacturing industries, continuous development and collaboration are needed among different operators in the manufacturing industry and within the solution providers. In the future, the core philosophy that welders are the welding operators will remain the same, but the focus should be on increasing the productivity and usability of the automation solution.

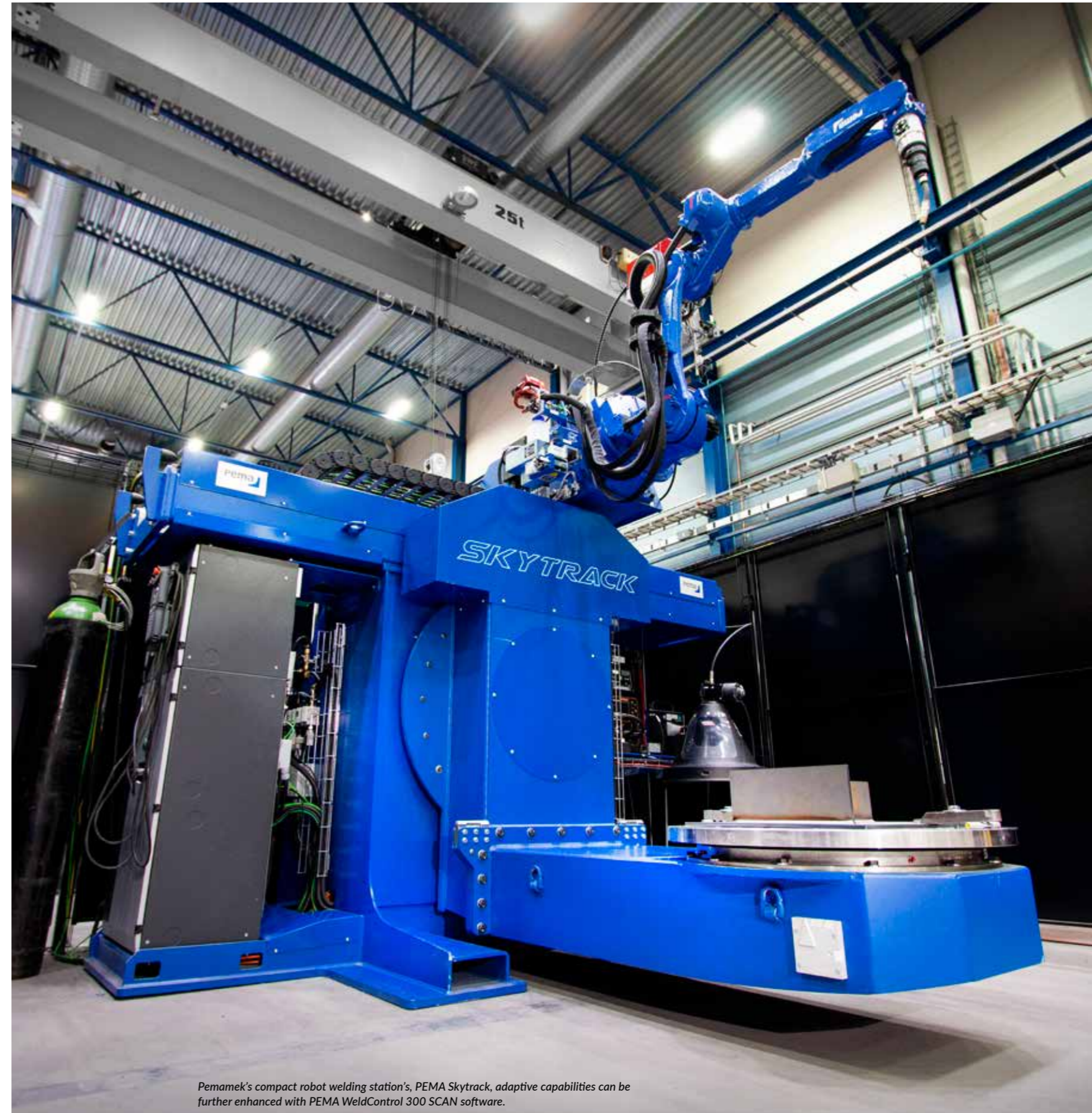
One potential development trajectory is improving the robot's reachability. When this is improved, robotic adaptive welding can be used in even smaller spaces, opening new doors in the spectrum of suitable workpieces. The advancements in the usability of the solutions are also highly valuable. By decreasing the number of needed actions by the operator in the control system, the operator is no longer tied to the control system and is therefore free to do other tasks.

As the HMI can do tasks in a more automated way, adaptive robotic welding could be paired with for example PEMA FMS solutions. In an optimal scenario, adaptive robotic welding could be utilized even in unmanned production. At Pemamek having the possibility to make the control system and solution optimization by in-house engineers and run thorough tests enables fast-paced responses for existing and new upcoming challenges.

Adaptive robotic welding has been used in the manufacturing industry for many years, but today the need for smarter, more responsive, and adaptive solutions is higher than ever before. ■

”Additionally, when automation takes care of both handling and welding, production efficiency and safety are maintained high.”

Automation level	Definition
Manual Welding	Welding is performed manually.
Partly mechanized welding	Manual welding with mechanized feeding of filler material.
Mechanized welding	Welding, where all the main processes (excluding workpiece handling) are automated. Manual adjusting of welding parameters during welding is possible.
Automatic welding	Welding, where all the main processes are automated. Manual adjusting of welding parameters during welding is not possible.
Robotic welding	Automatic welding performed by robot.
Adaptive welding	Automatic welding, where movements and welding parameters are adjusted automatically and in real-time according to information from sensors.



Pemamek's compact robot welding station's, PEMA Skytrack, adaptive capabilities can be further enhanced with PEMA WeldControl 300 SCAN software.

CUSTOMER

Fortaco Estonia OÜ

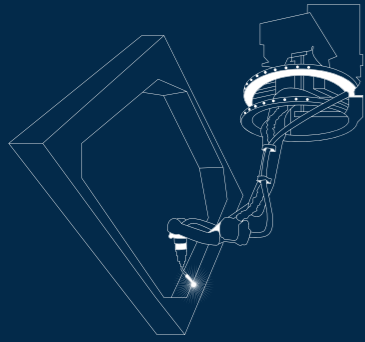
LOCATION

Narva, Estonia



SEGMENT

Heavy equipment



Text Emilia Vuorela Photos Olli Vesterinen

Meeting the demand of growth: Fortaco Estonia OÜ turns to Pemamek's plug-and-weld solution

During the past few years, Fortaco Estonia has experienced rapid growth and faced new capacity demands. To address the challenges, the company invested in Pemamek's plug-and-weld solution, PEMA Skytrack.

Fortaco Estonia OÜ, a renowned welding and machining company, has been on a trajectory of substantial growth. The company's customers mainly come from the heavy off-highway equipment and marine industries. Fortaco's offerings include technological R&D and design services, cabin manufacturing, machining, vehicle assemblies, steel fabrication, and machining.

With a focus on increasing capacity and guaranteeing welding quality, Fortaco sought innovative solutions to overcome its capacity challenges. Recognizing the need for advanced welding technology Fortaco Estonia turned to Pemamek for a plug-and-weld solution, PEMA Skytrack. ▶

With its forward-looking approach, Fortaco is well-prepared to navigate future demands and maintain its position as a leader in the industry.

Pre-made parameters

Some of the factors affecting the decision-making were short delivery time, quick implementation, and suitability for different types of projects. Also, complete equipment delivery was also an important factor.

With the pre-made parameters made by Pemamek's team, the Skytrack system perfectly aligned with Fortaco's requirements. To Pemamek Fortaco sent the 3D models of the workpieces that would be manufactured on Skytrack. Pemamek's team created variables for welding parameters and together the teams selected the most suitable option for Fortaco's use.

"PEMA Skytrack, being a compact robotic station, offered a convenient solution for us," says **Yaroslav Pechorin, Fortaco's Development Manager.**

Forward-looking approach

Fortaco's past growth and courage to invest showcase Fortaco's dedication to staying at the forefront of manufacturing efficiency and meeting evolving needs. With its forward-looking approach, Fortaco is well-prepared to navigate future demands and maintain its position as a leader in the industry.

"We are looking forward to starting operating the robot in full scope to see technical benefits in practice. This will be critical to take decisions about the next robot welding investments." **Larissa Shabunova, Managing Director of Fortaco Estonia.**

"PEMA Skytrack, being a compact robotic station, offered a convenient solution for us."



◀ With the pre-made parameters made by Pemamek's team, the Skytrack system perfectly aligned with Fortaco's requirements.



The team of Fortaco Estonia and Pemamek at Fortaco Narva's site.



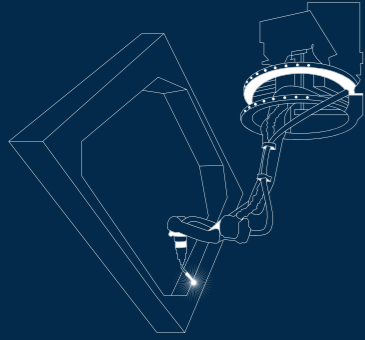
Fortaco provides a range of services, such as technological R&D and design services, cabin manufacturing, machining, vehicle assemblies, steel fabrication, and machining.

CUSTOMER
Harry Metall OÜ

LOCATION
Rannu, Estonia



SEGMENT
Heavy equipment



Text Pihla Ruohonen Photos Olli Vesterinen

Increased efficiency and production flexibility for Harry Metall with PEMA robotic welding station

PEMA robotic welding station reduces manual work from the Estonian manufacturing company Harry Metall OÜ. The station's automated technology enables a high-quality final product and increases production capacity with optimized welding processes.

The Estonian contract manufacturing company, **Harry Metall OÜ**, is situated in Rannu near Tartu, Estonia. The company was founded in 2001 and bought by a Finnish company, Ramtec Oy in 2010. Today, Harry Metall operates in a new, modern factory as a contract manufacturer for various companies, producing a range of products including different mining and earthworks buckets. Their main customers are export companies from Finland, Sweden, and Estonia. The investment in PEMA welding automation equipment was part of Harry Metall's future strategy for developing its products and aims to be strong and competitive in growing and highly competitive markets.

"Thanks to the modern PEMA welding solutions, we now have a higher level of automation, and the robot station increases our productivity significantly. The station's automated technology reduces manual work, producing a high-quality final product. The welding processes are optimized which also increases the production capacity", tells **Veikko Janhunen, Chairman of the Board** at Harry Metall OÜ.

More flexibility in small series production

Committed to delivering high-quality products to its customers, Harry Metall realized the need to find new ways to stay competitive. The aim was to find a solution that would bring improvements and efficiency to the heavy manufacturing process. To achieve this goal, they turned to Pemamek. Pemamek was already a familiar name to the company thanks to the PEMA APS 3-axis manual welding positioners that had been delivered to Harry Metall a few years earlier.

"We needed to find a solution that would bring more flexibility and volume to the small series production. We manufacture big volumes of products but in small series. Therefore, it was crucial for us that the programming would be easy and production flexible", says **Harry Salu**, General Director at Harry Metall OÜ, and continues: ►

"We manufacture big volumes of products but in small series. Therefore, it was crucial for us that the programming would be easy and production flexible."

Harry Salu, General Director at Harry Metall OÜ



Reducing manual work was among the key objectives for this investment. The aim was to introduce automation to the processes, enhancing quality while simultaneously lowering costs.



The Estonian company Harry Metall OÜ operates in a new, modern factory as a contract manufacturer for various companies, producing a range of products including different mining and earthworks buckets.

CUSTOMER STORY

"In addition, one of our main goals was to reduce manual work. The lack of welders is a global challenge. We wanted to add automation to our processes, increase quality and reduce costs. This robot station together with multi-pass welding brings us the flexibility and volume we were looking for. Thanks to its accuracy, no overflow or underfill occurs in the welding, and the weld quality is better with multipass welding."

Turn-key solution for heavy manufacturing

The goals Harry Metall set for the investment have successfully been achieved with the PEMA robot welding solution. The total delivery from Pemamek to Harry Metall included a robotic welding station with three external gantry axis, PEMA 10-ton 2-axis workpiece positioner, PEMA WeldControl 300 offline programming, five welding programs for different products, and welding process evaluation and parameters by PEMA welding engineers.

Harry Metall has valued the overall package that Pemamek provided and the expertise that Pemamek has provided throughout the customer journey.

"For us, the defining factor in choosing the PEMA solution was the credibility and the overall package that Pemamek could deliver with a good payback period. A critical factor for us was that Pemamek could provide several tailor-made programs for us. Pemamek's engineers programmed altogether five different welding programs for different products that we can start using immediately. The pre-tailored programs provide a good start to our investment", describes Janhunen.

Harry Metall has valued the support from Pemamek's side when it comes to implementation and making sure that the new equipment is adapted to production routines. When it was time to assemble the station, the project team from Pemamek traveled to Estonia and made the installation. They also provided training for the welders at Harry Metall to ensure a successful start. Service is provided for Harry Metall also in the future. Included in their investment is a PEMA service contract with annual services and program updates which make sure that the station is always equipped with the latest software. In their daily work, Harry Metall's team can get help from Pemamek's robotic experts by contacting the PEMA Robotic HelpDesk.

Plans for the future

Thinking about the investment in welding and production automation in the long run, the aim is to gain a competitive advantage. Flexibility, cost savings, and the ability to manufacture big volumes with less manual welding combined with increased quality and decreased costs are something Harry Metall finds extremely valuable. The cooperation between Pemamek and Harry Metall has been easy and smooth, and they have already been thinking about the next steps in the automation journey.

"We have calculated that the payback time for this investment is less than 3 years. We have already been thinking about the next investment in automation. One option that has been on the table is another robotic welding station", tells Janhunen. ■

"This robot station together with multi-pass welding brings us the flexibility and volume we were looking for."

Harry Salu, General Director at Harry Metall Ou



PEMA robotic welding station increases production capacity and flexibility with optimized welding processes. The investment is part of Harry Metall's future strategy for developing its products and aims to be strong and competitive in growing and highly competitive markets.

Text Ville Räike Photos Jonathan Österlund

Lamprell expands offshore wind capabilities with PEMA welding automation



CUSTOMER
Lamprell

LOCATION
Hamriyah, Unites Arab Emirates



SEGMENT
Wind energy



“This new investment enables us to expand to supply transition pieces for fixed and floating foundation projects, as well as to deliver monopiles.”

Lamprell, a prominent global player in the energy industry, is widely recognized for its comprehensive range of contracting services. The most recent strategic investment in PEMA heavy-duty welding, milling, and material handling solution enables Lamprell to broaden its expertise in foundation manufacturing into monopile and transition piece production.

According to **Luke Hammond, Lamprell's Project Manager** for this capital investment project, the company has made a significant investment by building a production line for the construction of foundations for use in the renewables sector. The particular emphasis has traditionally been on the European market however new target geographies are opening in the offshore wind space.

Located in Hamriyah, United Arab Emirates, Lamprell's main facilities serve as a central hub for its operations. With almost five decades of experience, Lamprell boasts a workforce of over 5,000 employees.

Traditionally Lamprell's expertise has primarily revolved around fixed offshore foundations, such as wind tower jackets, transition pieces and suction caissons.

“This new investment enables us to expand to supply transition pieces for fixed and floating foundation projects, as well as to deliver monopiles. It significantly broadens our client base and addressable market from jacket based foundations, to having an offering for all fixed and floating foundation projects” states Hammond.

With the PEMA solutions, Lamprell will be able to produce tubular products up to 10.5 meters in diameter with a material thickness of up to approximately 150 millimeters. ▶





▲ The scope of the delivery also covers services like supervision for installation, training, comprehensive spare parts packages, and production support.

▲ Lamprell's investment in Pemamek's welding automation is another firm step deeper into the renewable energy sector.

Together towards the solution

The project goal was clear from day one: to build a reliable solution that not only automates and streamlines production but is also adaptable to the existing facility space.

The installation of Pemamek's equipment at Lamprell's Hamriyah yard in the United Arab Emirates was completed during early spring 2023 followed by the startup and early production phase which is currently ongoing. Luke Hammond commends the smooth cooperation and good-spirited teamwork between Lamprell and Pemamek throughout the planning and delivery process.

"In terms of working with Pemamek, it has been fantastic. All the guys have been very flexible. There's been a really good spirit of teamwork. We've worked together to deliver the equipment and continue to streamline the startup and early production together – Special credit to Wille Aitasalo, PEMA Project Manager, Gharbi Sellami – PEMA site Manager, Billy McDonald – Lamprell Package Manager, Jovo Milos – Lamprell Technical Authority, Bharat Shetye and Ubaid Sidiqqi who have managed site operations, and appreciation to the wider teams within both organisations" says Hammond.

Adapting to the new solution has been a positive experience for Lamprell's workforce. Hammond shares his observations: "The guys in the fabrication yard have been very interested in learning about the new solution and working on the new technology. They are really focused and involved in the training and see this as a good thing for their personal professional development as well."

Strategic step into the future

Lamprell's investment in Pemamek's welding automation is another major step forward, moving even deeper into the renewable energy sector.

"In terms of working with Pemamek, it has been fantastic. All the guys have been very flexible. There's been a really good spirit of teamwork."

"Our focus is to build backlog and to deliver our projects as efficiently and safely as possible. Meeting this target was one of the reasons why we invested in PEMA welding automation equipment," says Hammond.

The delivery includes PEMA machines specifically selected and dimensioned as a complete solution to meet Lamprell's production needs. The extensive equipment delivery includes for example PEMA milling equipment for plate short-edge, longitudinal and circular milling. Flange fitting and welding, PEMA WS2 for circular outside welding, PEMA C&B HD and assembly station for section assembly and inside welding, and PEMA roller beds. The machinery is controlled and operated by PEMA WeldControl 100 & 500 control systems.

The scope of the delivery also covers services like supervision for installation, training, comprehensive spare parts packages, and production support.

Eye on the benefits

PEMA's solution together with the continuous collaboration will enhance Lamprell's production capabilities. It will ensure repeatable high-level quality performance with data-based visibility of the production processes.

Luke Hammond opens the future benefits: "There are a few key points: material handling efficiency, welding efficiency, deposition improvement, general tonnage throughput within our facility. And as mentioned earlier, this expands our product offering."

On top of this, PEMA's solution allows Lamprell for parallel fabrication activity making the production of large-diameter products more efficient and controlled. ■



CUSTOMER

Damen Galati Shipyard

LOCATION

Galati, Romania



SEGMENT

Shipbuilding



”On average we manufacture 20 ships per year. Our latest investment in the robotized PEMA micro panel fabrication line is one of our biggest investments in automation.”

Photo: Damen Galati Shipyard

Text Emilia Vuorela Photos Olli Vesterinen

Damen Galati embraces modern technologies in micro-panel welding

As the shipbuilding industry continues to evolve and adapt to meet the demands of a changing market, automation has emerged as a key driver of innovation and success. In this article, we explore the story of Damen Galati Shipyard and how it has embraced automation to stay competitive in a globalized market.

Damen Galati Shipyard, located in the South-East of Romania in Galati, is one of the largest production sites of the Dutch Damen Group. With a long and storied history, the shipyard was established in 1893, and over the years it has evolved into a full-fledged shipyard. In 1999, Damen took over the shipyard, and since then the company has continued to invest heavily in its development.

”We work mainly in shipbuilding but lately we have also extended to pipes and aluminum structures for the AC/DC offshore wind energy platforms. Our specialty is to be able to build ships in a very wide selection. Almost any kind of vessel from tugs to icebreakers and yachts. That is one of our strengths, to be so versatile and able to build almost everything from harbor and military to leisure,” starts **Doru Gaibar, Managing Director at Damen Shipyards Galati**, who has been for the shipyard since 2000.

To date, the company has invested over 140 million euros in the shipyard, helping to modernize its facilities and equipment and to expand its range of services. These investments have allowed Damen to remain at the forefront of the industry.

”On average we manufacture 20 ships per year. Our latest investment in the robotized PEMA micro panel fabrication line is one of our biggest investments in automation,” says Doru.

Automating micro-panel manufacturing

When Damen Galati started to consider investing in automation, the shipyard wanted to ensure that it would meet their specific needs and requirements for micro-panels, Doru continues: ”We build fully outfitted blocks. For the main panels, we have a panel line, but for micro-panels, everything is manufactured by hand.”

Damen’s motivation to explore welding automation was driven by several factors, including the need to enhance efficiency and address the lack of welders. Additionally, the pursuit of more accurate welding quality was another important consideration.

”Currently, we need more welders than there are currently available. Another aspect of the investment is ensuring very high-quality welding, and this is something that PEMA automation equipment can offer,” Doru adds. ▶



"I always ask this question, why are there companies who are already incorporating automation, but we are not? Developing ourselves and processes has been one of the drivers."

With extensive expertise in shipyard automation, Pemamek's offering for automated micro-panel fabrication consisted of PEMA Stiffener Assembly Station (SAM), Vision Robot Welding Portal (VRWP-C), Service Portal (SP), and welding floor with chain for panel transportation. PEMA Micro Panel Line is designed to fabricate flat bulkheads and webs with varying stiffener directions.

The core of the line is PEMA VRWP-C equipped with one robot arm and a patented programming system, WeldControl 200 Visio. The software is based on camera scanning enabling fast and easy weld path creation for the operator.

In the discussion phase, Pemamek conducted extensive welding tests with Damen's workpieces. "Human nature is so that you have to see it before believing in it." The test welds and seeing Pemamek's factory facilities finally convinced us," explains Doru.

In addition to the test welding, the shipyard also attended a shipbuilding event organized by Pemamek. The event provided an opportunity for the shipyard to learn from other companies and hear their stories and experiences. "I always ask this question, why are there companies who are already incorporating automation, but we are not? Developing ourselves and processes has been one of the drivers," says Doru.

Evolving customer expectations

The PEMA Micro Panel Line will be delivered to Galati and ready for full production in autumn 2023. In addition to reinforcing efficiency, Damen sees investments in automation as having a bigger meaning. "The more globalized we are, the more we need to consider overall competitiveness," notes Doru. "Customers are now more discerning, expecting not only quality but also sustainability, health, and safety. Through investments, companies can also present what they value and find important."

Reflecting on Damen's experience, Doru offers a tip to others considering automation: "Don't hesitate, because automation is the future. In the future, shipyards can leverage the benefits that automation brings to businesses, from increased productivity to improved quality and safety." ■



Damen's team visiting Pemamek for the final acceptance test before the machinery delivery to the shipyard.



PEMA Vision Robot Welding Portal (VRWP-C) is equipped with one robot arm and patented programming system.

Text Emilia Vuorela Photos Lauri Paasio

Scanning and adaptivity: Smart PEMA robotic welding technology transforms NWP's pressure vessel manufacturing

CUSTOMER

NWP Industries LP

LOCATION

Central Alberta, Canada



SEGMENT

Offshore & Process



"The key factors are the advanced technological features: scanning and adaptivity."

Amid the increasing lack of welders and inclining prices, the Canadian NWP invested in automated production technology to streamline and secure its future production capacity. With the PEMA Robotic Nozzle Welding station and smart automation technologies, the company has improved its production consistency, and quality and gained significant savings in production time.

Surrounded by the flourishing fields of Central Alberta, a large production site welcomes its visitors. The facility, called Innisfail Manufacturing, belongs to a prestigious Canadian oil & gas equipment manufacturer NWP Industries LP.

The company, a part of **Terravest Industries (TVK.TO)**, operates in the oil and gas, renewables, mining, and agriculture sectors. The main products are pressure vessels and turn key energy processing equipment. As a major pressure vessel manufacturer, four to six pressure vessels go through the production pipeline weekly. The yearly volume reaches as high as 250 pieces.

"The total amount of pressure vessels is significant, but at the same time we are constantly challenged by the common phenomena; to find skilled workers for the factory. Thus, researching alternative manufacturing options, instead of manual welding, has become crucial," describes **Jason Greene, President of the Energy Processing Equipment Division, Terravest Industries.**

Robotized nozzle welding

From the manufacturing point of view, the structure of a pressure vessel with nozzles is complicated. The process includes several detailed steps from machining to cutting and surfacing. In each step precision is vital. Typically, the most demanding phase is nozzle welding due to the varied groove geometries and very strict quality requirements.

"The pressure vessels we manufacture are with nozzles and piping, diameters being 24", 36" and 48". Before all nozzles were welded manually." **Steve Becker, Plant Manager at NWP** continues, "Now with the new welding technology that incorporates scanning, adaptivity welding, and offline programming, we are capable to weld everything automatically."

The production equipment delivered to NWP is the PEMA Robotic Nozzle Welding station. The solution includes integrated material handling, one welding robot gantry, and Lincoln Electric welding equipment. At the core of the smart robotic welding solution is Pemamek's in-house designed PEMA WeldControl 300 SCAN developed specifically for changing groove geometries.

"The key factors are the advanced technological features: scanning and adaptivity. With this robotic solution, we have gained great results in nozzle welding. While welding quality, consistency, and welding speed have improved, the repair rate of welds has reduced," tells Becker.

Advanced pre-planning & preparations

In high-quality welding automation deliveries, turn-key services are fundamental to ensure a fast transition phase for the customer and an efficient start of production. The delivery to NWP includes a preventive maintenance agreement, spare parts package, production start-up support, and welding process support. Technical support services are provided by Pemamek's local partner in Canada, **All Fabrication Machinery**. The company's president, **Giles Young**, has been an important facilitator throughout the project and will assist future projects in the area as well. ▶

The robotic welding station for nozzle welding was delivered during the summer of 2022 and has been now a part of NWP's daily operation routines for a couple of months. According to Greene, the implementation and start of production have gone smoothly, and gives a special endorsement to Pemamek for the prompt communication throughout the collaboration.

"Our team has adopted well the equipment and production method. This is mainly due to the advanced pre-planning and operations before the delivery. Additionally, the communication with Pemamek has been very responsive and fast. Throughout the discussions, the team from Pemamek was eager to do the research and use their expertise to find a solution that is the right one for us. The visit to Finland to Pemamek's factory was important and convincing."

"Our team has adopted well the equipment and production method. This is mainly due to the advanced pre-planning and operations before the delivery."

60-70% time savings

Clear results from the investment are already visible. As the company's order book is strong, NWP is eager to reap further benefits from its fresh investment in modern robotic welding equipment.

"The real savings come from nozzle welding. Our initial objective was to complete the work equaling to the job of 5-6 welders on the station. Once the station has reached its full capacity, we look to gain 60-70% savings on time," Becker tells.

Finally, when asked about the possible tips for companies considering investing in automated welding solutions in the future, there's a clear answer.

"The people on the shopfloor should be integrated into the process and familiarized with the new solution early enough. When it comes to the factory, it is important to consider the new layout well before the delivery," summarizes Greene. ■

► *The people on the shopfloor should be integrated into the process and familiarized with the new solution early enough." Jason Greene, President of the Energy Processing Equipment Division, Terravest Industries.*



Text Emilia Vuorela Photos BAE Systems Australia

Using automation to create efficiencies on the Hunter class frigate program

With the support of advanced PEMA shipyard automation, BAE Systems Australia has been able to automate the installation and welding of up to 30 steel profiles a day for the Hunter Class Frigate Program.

Through Hunter, BAE Systems Australia, which is one of the largest defence and security companies in Australia, will deliver a formidable fleet of anti-submarine warfare frigates to the Royal Australian Navy.

At the state-of-the-art Osborne Naval Shipyard in South Australia, modern and innovative manufacturing methods and automated and semi-automated equipment are changing the face of shipbuilding.

In 2020 PEMA shipyard automation machinery was delivered to the shipyard, which has helped the workforce boost production efficiencies and deliver better quality product, while also reducing the physical demands on people.

Welding 30 steel profiles per day

Tom Johnson, Manufacturing Engineer and Robotics and Automation Lead at BAE Systems Australia, has been working with PEMA's stiffener mounting welding portal (SMWP) for 30 months.

Typically, each Hunter frigate requires more than 1,000 steel profiles. Tom has been working with Pemamek's Service Manager, Jonathan Österlund, to refine production efficiencies and reduce the manual work required by the workforce.

With the support of one person, the PEMA SMWP can automatically install and weld up to 30 steel profiles a day, each up to 13m in length. Traditionally, this would be done by two people, achieving four steel profiles a day. According to Tom, software updates to the PEMA SMWP have further reduced the taxing, physical nature of the work – including getting the team off their knees.

"The alternative would be that workers would have to manually position and then weld each profile, whereas the SMWP saves manual handling and time on knees. That means fewer incidents and injuries, and the time saving is massive," he said.

Tom said cultivating the supplier relationship has been really important for the program.

"We're at the start of a multi-decade program, so we'd like to keep the relationship and our future collaboration as strong as we can. The equipment Pemamek has delivered is extremely capable, and by working together, we've further improved that to meet our demanding needs for the warship that we're producing."

CUSTOMER

BAE Systems Australia

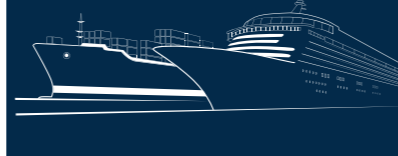
LOCATION

Australia



SEGMENT

Shipbuilding



Did you know?

PEMA Service engineers are born to travel, and they can travel over 200 days per year.

To give you a perspective, below you see the far corners of the world where we have maintenance agreements:

- WEST: Vancouver, Canada
- EAST: Osaka, Tokio
- NORTH: Kalajoki, Finland
- SOUTH: Adelaide, Australia



Hit the ground running

According to Pemamek's Jonathan Österlund, his experience at the shipyard has been one of the highlights of his career.

"This is the first time I've been so involved in a program's prototyping phase, and what we've been able to achieve together is to modify the machinery to deliver BAE's preferred workflow," Jonathan said.

"I've learned the people here are very good with automatization, and now, at the end of the prototyping phase, they understand the machinery almost as well as I do. Pemamek is always trying to find ways to make our machinery better and more efficient, so it's a definite win-win situation for both companies."

Tom said the improvements made to systems, processes, and equipment during the Hunter program's prototyping phase will greatly benefit the warship construction phase.

"You've got to remember we've got a new yard, it's a new build: there's a lot of change and learning to be done. So, it means when we are approved for Batch 1, we can really hit the ground running."

Construction on the first schedule protection block will commence in May. This block and three more will be capable of being used in the first Hunter class frigate. ■

▲ According to Tom Johnson, cultivating the supplier relationship has been really important for the program.

"The equipment Pemamek has delivered is extremely capable, and by working together, we've further improved that to meet our demanding needs for the warship that we're producing."

▼ Tom & Jonathan. Photo: BAE.



Text Emilia Vuorela Photos Olli Vesterinen

Creating meaningful connections & competitive edge

The year 2023 is big for Pemamek as the Schweissen & Schneiden returns to Essen and Pemamek also celebrates the Grand Opening of its latest factory expansion. We interviewed Pemamek’s Event Manager, Elina Plathin, to understand why events play such an important role in the industry.

“Funny coincidence, but my first contact with Pemamek was at an event. The global presence and scale of operations took my breath away. When I saw that the company was looking for Event Manager, I knew this would be my shot”, starts **Elina Plathin, Pemamek’s Event Manager.**

Raised by a family of entrepreneurs and having a background in project houses, Elina describes herself as a people-person who enjoys the balance of lean processes, development, and dynamic doing. When it comes to Pemamek, the first thing that caught Plathin’s eye was the open culture and how people interacted with each other.

“When I stepped into the company, everything starting from the welcoming process was well taken care of. More importantly, I was happy to see how the externally communicated values came into reality. I think it is safe to say that it was love at first sight”, Plathin smiles.

At Pemamek, Plathin is responsible for managing and coordinating the company’s events from global exhibitions to webinars and internal events. During the upcoming year, Pemamek participates in more than 20 global exhibitions across indus-

tries, such as Metal Madrid, Global Offshore Wind in London, Fabtech in Chicago, and Advanced Manufacturing in Madrid. The main exhibition of the year is Schweissen & Schneiden in Essen, Germany.

“We have 22 exhibitions to be exact. While the year looks busy, I enjoy the versatility and different challenges that this role offers. Even though we collaborate with the top partners in the industry, most of the creative and organizational part for each event is done in-house”, Plathin describes.

In addition to exhibitions and webinars, in the coming summer, Pemamek celebrates the Grand Opening of its latest factory expansion. The last celebration was organized in 2017 when the 2nd expansion was inaugurated.

“Taking part in industry events is important to us, but just as important is organizing events on our premises. That enables us to showcase our latest technological innovations and share our knowledge in welding automation in a way that resonates with the segment. By coming to our facilities, people create a more unique connection with Pemamek”, Plathin comments.

For global companies, competitive advantage is a combination of several things. Plathin sees that excel-

“Taking part in industry events is important to us, but just as important is organizing events on our premises.”

ling in events and creating a distinctive experience for the participants is one of them. Plathin continues: “Events enable meaningful interactions and discussions within the existing and new network. I’m sure that by now we all have learned that these moments can’t be taken for granted.

Through events, we can grow our global community around the PEMA welding automation in a way that otherwise would not be possible.”

Text Emilia Vuorela Photos Olli Vesterinen

Fostering responsible manufacturing

With the wind energy sector expanding and new responsibility regulations set to take effect in 2026, Pemamek has launched an initiative to adopt a transparent approach to its responsibility efforts. Antti-Jussi Kyläsorri, Pemamek’s Quality Manager, sheds light on the concrete steps being taken.



▲ Antti-Jussi Kyläsorri, the Quality Manager at Pemamek Ltd.

“During the past years, the operational environment has changed significantly, but also Pemamek’s growth in the wind energy sector and regulations have inspired us to launch this initiative. We think that acting responsibly and considering sustainability in the context of heavy manufacturing also strengthens our competitive edge,” explains **Antti-Jussi Kyläsorri, the Quality Manager at Pemamek Ltd.**

In late 2022, Pemamek launched an initiative to make its responsibility efforts visible. The initiative’s first step was to conduct a workshop in which the company’s current ESG level, future ambition level, and focus areas were determined. The launch of the initiative has given Pemamek a clear roadmap to move forward.

As an example, Kyläsorri mentions the recently published responsibility report. “This report is now our first official one. While it provides us a clear way to prog-

ress, where to focus and what to measure, it also emphasizes the accountability of our work,” Kyläsorri adds.

Responsibility has always been a core value for Pemamek and its way of working. Pemamek has been working under the energy efficiency agreement for years and has constantly strengthened its role in being a pioneer in developing enabling technologies for its customers.

“We take pride in our role in enabling the offshore and onshore wind energy sectors’ efficient manufacturing,” Kyläsorri continues. “We have innovated semi-narrow gap welding for thick materials, one of the many technologies the company has developed.”

With the initiative, Pemamek aims to build a foundation that helps the company make its work systematic and organized, and ultimately become a role model for other companies in the industry.

Pemamek’s latest responsibility stats*:

- In 2022 Pemamek managed to utilize nearly 100% of the waste generated in our processes for energy production and further reuse.
- Whistle blowing channel was founded in 03/23

Source: Pemamek responsibility report, 2023

Pemamek in the following global exhibitions:



Want to meet our team? Scan the QR to access our constantly updated event list:



Pemamek Ltd., founded in 1970, is a global welding and production automation leader. The company designs and manufactures welding automation technology and integrated manufacturing solutions to a wide range of heavy metal industries.

With the extensive 50-year experience in welding and production automation, Pemamek is dedicated to helping heavy fabrication industries to raise the level of productivity. PEMA solutions are based on the highly advanced robot and automation technologies that significantly increase throughput on heavy fabrication lines.

In addition to the headquarters and factory in Finland, Pemamek has daughter companies in USA, Italy, Spain, and Germany, but also local sales offices in Brazil and Poland.

- PEMA Headquarters in Loimaa, Finland
- Pemamek daughter companies: Pemamek USA, Pemamek Germany, Pemamek Iberia, Pemamek Italy
- PEMA Sales Offices: Brazil, Poland



OVER **50**

Years of experience

OVER **15,000**

Number of delivered solutions

OVER **50**

Countries with PEMA deliveries

General Fabrication • Heavy Equipment • Wind Energy • Shipbuilding • Power Generation • Offshore and Process Equipment

PEMAMEK.COM