SEPTEMBER/OCTOBER
2022

WELDING PRODUCTIVITY

Knowledge is power

- I Systems & Equipment
- I Key Industry – Shipbuilding
- I Filler Metals

SAWING PRODUCTIVITY

TRADE SHOW
SHOWCASE

FABTECH 2022 PREVIEW

by Jimmy Myers, senior editor

SHIP SHAPE

A heavy equipment welding automation provider addresses digitization and the future of shipbuilding

There was a time when the challenge in shipbuilding was finding machines capable of holding massive metal plates together so that they could be welded to the sea-going vessels. Pemamek, a Finland-based company that has for years offered solutions for joining materials weighing many tons, conquered that challenge when it designed a digital platform solution to facilitate customers' various processes. Now that we're living, largely, in a digitized world where data is an integral aspect of manufacturing, the challenge has shifted to the flow of that data.

No stranger to assisting the manufacturing industry, Pemamek has supported the shipbuilding industry with digital platforms that include modules for assisting in everything from the design phase to planning to manufacturing, as well as cloud reporting solutions for the increasingly digital world.

Jukka Rantala, vice president of sales and key accounts at Pemamek, says as he looks at the current state of the shipbuilding industry and to the years ahead, he's seeing a need for more automated solutions, robotics and digitization solutions.

SPECIALIZED SOFTWARE

Many shipyards have embraced 3-D engineering software, which is used to design many products involved in shipbuilding. Yet, the challenge is that these models are not always importable to the machines as-is, which means that specialized software and human interaction (which brings the human error element) become part of the scenario. According to Rantala, as more of the data transfer within the shipyards becomes digitized, customers want more options in analyzing the data regarding production and maintenance.

"At the same time," he says, "we need more info from the customers about the products so our automated systems can really run the production and so data traffic can go back and forth."

> "A few years back, it was only the biggest shipbuilders using automated systems, but now it's come down to the smaller shipbuilders, too."
>
> *Jukka Rantala, vice president of sales and key accounts, Pemamek*

To that end, Pemamek has partnered with Prostep, a vendor-neutral consulting and software company that focuses on product lifecycle management (PLM), to partner in developing the Pema Open PDM interface that allows users to collect and map data parameters from their designs. This solution basically gives users the ability to create a plan that includes all the information they need to control production automation machinery.

"Software and control systems are becoming more and more important," Rantala says, adding that they also need to be user friendly and easy to use. "A few years back, it was only the biggest shipbuilders using automated systems, but now it's come down to the smaller shipbuilders, too."

The future of shipbuilding depends on production enhancements, such as Pemamek's automated panel line that reduces the dependency on human capital.

And each shipbuilder has different needs, which is what makes designing software such a complex task. That's another reason Rantala says Prostep was brought in, because the utilization and customization of 3-D design software is a "wild world," and why they partnered with Prostep, because "they are the software gurus" that are able to dig in and get the right information that Pemamek's robots need.

3-D ADVANCEMENTS

Pemamek builds its solutions based on 3-D modeling and 3-D CAD. Heavy 3-D engineering packages are simplified and modified via the use of tools such as simulation software that enables virtual reality, augmented reality and digital twin. For those new to digital twin, it's a virtual representation of an object that helps manufacturers view its actual physical structure.

Production lines are most often converted to a simple virtual model for general overview purposes and for Supervisory Control and Data Acquisition (SCADA)-type monitoring. However, Pemamek offers functional digital twin for individual machines so customers can plan and simulate effectively. The digital twin includes a machine virtual model with all main movements, and programmable logic controller (PLC) functions are available that are run through PC-based human-machine interface (HMI) twin, which simulates various imagined situations.

Pemamek has offered HMI capabilities for several years. Digital development and integration are, as Tommi Reponen, Pemamek's application manager, shipbuilding, said in a recent newsletter, "constantly more visible, and the operation happens from control desks or central control rooms."

Stiffeners in shipbuilding help reinforce ships' panels, and with a large range of adjustable mobile portals with stiffener manipulating devices, operators can fit the stiffeners in any direction, using manual or fully automated technology.

> "We need more info from the customers about the products so our automated systems can really run the production and so data traffic can go back and forth."
>
> *Jukka Rantala, vice president of sales and key accounts, Pemamek*

Reponen says for production lines, Pemamek digital platform solutions can be supplemented with a central production line monitoring solution, which is web-based and available that operated with any HTML5-compatible web client. Its features include showing the state of each production unit, production status on each production unit, safety and alarm diagnostic by-product units and an error log.

Rantala says the goal is to make the equipment and software "user friendly

and easy to use. The target is for the welding systems to be welding, not waiting for orders from the programming people."

SAFE, STEADY PRODUCTION

As Rantala notes, Pemamek has focused on automated solutions that improve efficiency as well as keep safety in mind. For example, traditional shipbuilding required dozens of welders working in environments where large and heavy plates were maneuvered via a crane or hoist of some sort. With the automated solution, the robotic welder does almost all the work while the workpieces are secured in place by Pemamek's assembly solutions, which can be overseen by one person.

With Pemamek's integrated stiffener mounting and welding portal, shipbuilders can tackle panel production in an automated fashion, improving productivity and reducing errors.

"The efficiency is coming with automated welding," he says. "The robot is welding all the time. There are no lunch breaks or bathroom breaks or anything like that. That's where the efficiencies are coming from."

Furthermore, Reponen says operators can watch the workpieces being processed via monitoring screens. Safety, which is always an important topic for manufacturers, is also highlighted in the Pemamek system with a machine safety view that provides information on the status of safety equipment, including emergency stop buttons and light curtains.

THE NEW NORM

Rantala says the move to going paperless is big right now, particularly as data analytics and reporting are important topics for shipbuilders today as they look to improve data management. Shipbuilders are taking their designs completely digital and at

the same time, “everyone is trying to find more and more different tasks for what a robot can do.”

Fast and easy access is important, which is why Pemamek’s platform offers a web-based reporting dashboard compatible with an HTML5 web client. Furthermore, it offers organized reporting and analytics capabilities that are integral for making fact-based decisions. The benefit of implementing such a digital platform solution is that users have the ability to anticipate and foresee future developments, making them proactive rather than reactive.

Having this type of solution available will benefit shipbuilders now and in the near future, as naval and cruise ship manufacturers are focused on building lighter weight ships. In fact, Rantala says materials used in shipbuilding are becoming lighter and more “exotic.”

“They try to make it as light as possible,” he says, “but still, in certain places of the ship you need thicker materials. When you need to weld thick and thin materials together, it’s not as simple as welding similar materials together. It’s really common in naval and cruise shipbuilding. That has been one of the main topics from the very beginning when we make a robotic application: It needs to be fast and so easy. If you are able to use the mouse of the computer and get a few days of training, you’ll be able to utilize the machine.” ■

PEMAMEK

WE CAN HELP YOU OR YOUR CUSTOMERS REACH KEY OBJECTIVES

OBJECTIVES	RESOURCE/ACTION	EXPLANATION
Increase sales	TCO Estimator reshorenow.org/TCO-estimator	Convince customers to import less and source more from you. We helped one company win a $60 million order vs. China this way.
Find new customers	Import Substitution Program (ISP) reshorenow.org/ISP	Identify importers of what you produce. Use TCO to convince them to buy from you instead.
Reduce cost and deal with supply chain disruptions	TCO Estimator https://reshorenow.org/blog/impact-of-using-tco-instead-of-price/	20% to 30% of imports would be more profitably sourced here.
Reduce inventory	Reshore Find local sources	Expect 50% inventory reduction. One SKU was cut 94%.
Skilled workforce	Reshore	Employees will be more loyal if you are loyal to your community.

2021 North American National Metalworking RESHORING AWARD

See if reshoring makes economic sense for your company or for your customers who have offshored. Email or call the non-profit Reshoring Initiative at info@reshorenow.org or 847-867-1144. For more details read ‘Moser on Manufacturing’ in this issue.

Reshoring Initiative | 847-867-1144
Info@ReshoreNow.org | www.ReshoreNow.org

Reshoring Initiative® Bringing Manufacturing Back Home