Maximising output, quality and efficiency with data and AI

Amid rising raw material costs and skilled labour shortages, SMARTECH's solutions to reduce wax and resin in wood panel production and to bring autonomy to the production process can alleviate market woes.

By **Yap Shi Quan**

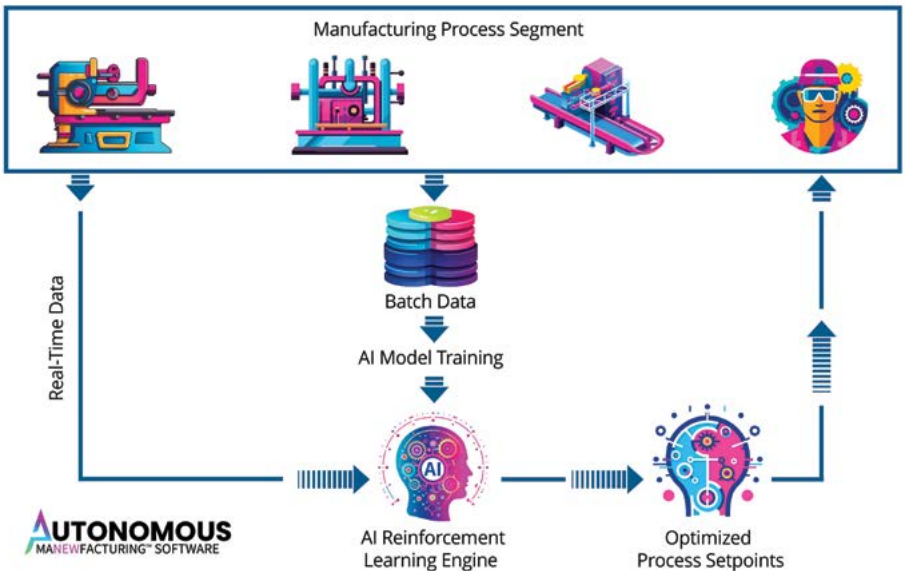
Autonomous Manewfacturing, SMARTECH's AI-based platform

Wood panel manufacturers of late probably have felt the effects of market challenges like inflation, manpower shortages, and supply chain disruptions on their production.

Rising prices of raw materials like wax and resin have brought down profits since raw materials comprise 50-60% of the cost to produce wood panels. When experienced workers who have worked decades in factories retire, they take away with them years of production knowledge. New hires have to learn the unique processes and intricacies of each piece of equipment, and efficiency — and possibly quality — suffers as a result. It takes a lot of time and resources to train new operators, bringing inefficiencies and production instability in the interim.

Although advanced methods of production such as artificial intelligence

(AI), machine learning (ML) and smart technology can potentially mitigate these issues, there is still some resistance within the industry towards their adoption. The preference is still traditional methods, as Hanoch Magid, CEO of SMARTECH, an Israeli technology provider to the wood panel industry, observed: "The first issue is there is not much development of AI technology in this industry. The second issue is that industry itself is reluctant to adopt new technology because new methods of production raise the level of risk to what has typically been a modest, though predictable profit margin."



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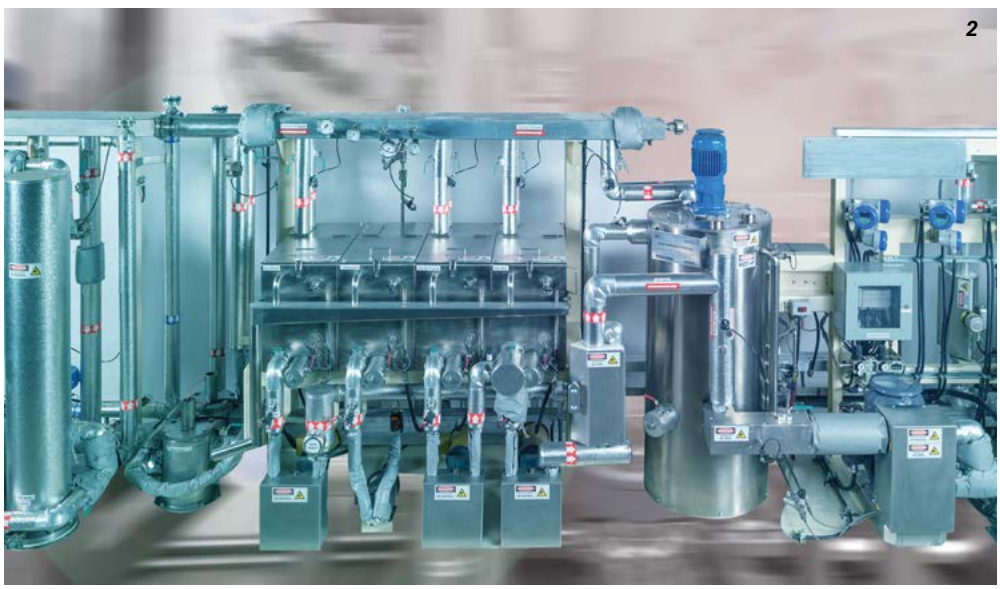

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BRINGING AUTONOMY TO PRODUCTION LINES TO INCREASE PROFITABILITY

SMARTECH was therefore formed to integrate highly innovative technology into the traditional panel manufacturing industry by targeting two aspects of production that bring high costs: manpower and raw materials.

"Lapses in the production line, such as the factory running over the weekend, differences in production output between morning and night shifts or between summer and winter, or the equipment not synchronised with combinations of different raw materials, can lead to inefficiencies and instabilities," said Magid. "Combined with the recent manpower crunch, such variances in production can lead to not only losses in output and quality, but also opportunities to create more with less."

SMARTECH has also witnessed instances where wood panel manufacturers did not fully take advantage of the vast amount of data in their factories. "As a result, we took the challenge to develop a one-of-a-kind AI-based solution that unleashes the power of data: the Autonomous Manewfacturing Platform to minimise such fluctuations and increase the production capacity by using AI and ML algorithms," explained Magid.

The software begins by creating a profile of the line, then takes real-time information from the production line and the operators' inputs. It manipulates the critical processes — be it, for instance, a continuous press or a multi-opening press — by taking control of the process. The software streamlines and uses the data by synchronising performance between machines, raw materials, processes, and operators.

As Magid explained: "Operating the press is not trivial and that is the reason why a shortage of experienced operators in the control room can be detrimental to the bottom line. Today the novice operator can function like experienced operators with our AI-based software, thus increasing the production capacity and decreasing costs."

Furthermore, a typical line may have about 15-20 screens for operators to monitor. With Autonomous Manewfacturing, operators monitor a single screen where all the activity is shown and from where the line itself can be controlled. The system can guide the operator or be set to autonomous mode.

The main thing the operator needs to learn is how to troubleshoot failures when they occur in the line, according

Legend
1 *How Autonomous Manewfacturing works*
2 *The standard SMARTWAX system*

to Hansjorg Prettner, vice-president APAC and Europe for SMARTECH. He also stressed that their solutions aim to extract more value from the line and enhance its overall performance and efficiency: “Whether it is in Europe or Asia, every manufacturer faces the same issues: line efficiency and experienced manpower shortages. With our smart solutions, the factory becomes more profitable while mitigating the consequences of shorter tenured staff.”

RAW MATERIAL MANIPULATION TO REDUCE COSTS

SMARTECH has two solutions that focus on reducing the use of raw materials: the first is SMARTWAX, which transforms wax with water and benign surfactant into a semi-stable suspension; the second is SMARTRESIN — further subcategorised into SMARTMDI for methylene diphenyl diisocyanate (MDI) and SMARTPF for phenol formaldehyde (PF). SMARTMDI transforms MDI resin to a water-based suspension with controlled droplet size.

“What we have done is to manipulate the raw material in real time so that it can be used more optimally. By manipulating the wax, we manage to cut the cost of using it by 30-40% — a figure almost unheard of — and manipulating the resin also helped to cut resin costs by 15%,” elaborated Magid.

“Less MDI is needed, and it is easier to handle with significantly lower viscosity. The SMARTPF resin reactor solution manipulates and treats PF inline and brings it to optimal working condition.”

Prettner added: “SMARTWAX comes in two sizes: The SMARTWAX standard system that supports high volume production lines, and the SMARTWAX ECO, a plug-and-play system which has been designed for smaller lines. The standard SMARTWAX can be installed on-site with the support of SMARTECH’s engineering team or can be done remotely — like we did in India, Vietnam and Brazil during times of restricted travel.”

Magid emphasised that SMARTWAX or SMARTRESIN systems have been specifically designed to ensure minimal disruption to the production processes. They are installed in parallel to the line with minimal disturbance while leaving the existing dosing system as a backup. The system is modular and the savings immediate.

Additionally, SMARTECH’s monitoring control system allows operators to oversee the existing systems in the customer’s site and support them remotely, for instance, by sending notifications like ‘clean the filter’ when needed, or by resolving technical issues in real-time.

TRANSFORMING THE WOOD PANEL INDUSTRY

At the biannual woodworking trade fair LIGNA in May 2023, Magid expressed surprise at the level of interest towards smart technology: “We were delighted with the interest of wood panel manufacturers in our autonomous manufacturing solution and the fact that many are thrilled with the opportunity and are actively seeking to implement our solution.”

Both Prettner and Magid declare that SMARTECH is here to “transform the entire wood panel industry and make it a more profitable business”. They believe that the Autonomous Manewfacturing Platform can drive any type of production for better performance — be it particleboard, medium-density fibreboard (MDF), oriented strand board (OSB), as well as in other industries.

And their declaration is not unfounded. After their first installation of SMARTWAX eight years ago, SMARTECH now has about 50 systems installed worldwide. SMARTECH has also clinched global awards and collaborated with brands like Siempelkamp on the Prod-IQ · SmartPress AI solution to increase press throughput and quality while lowering manufacturing costs.

Their confidence in themselves is also clear from how they reel prospective customers in: They state in their contract that if the customer does not get the savings that SMARTECH has promised them, SMARTECH will take back the system and return to the customer their money.

“Before installing our smart material systems and our autonomous manufacturing software, we learn the customers’ data and present them a valuable analysis, evaluating the potential savings and increase in production they can achieve with our solutions,” said Prettner. “And so far, we have never had the case of having to take back an installation.” P

Hanoch Magid, CEO of SMARTECH

Hansjorg Prettner, vice-president of APAC and Europe for SMARTECH