Material FlowHow

METAL 2025

Pesmel Material Flow WMS
Managing demanding material flows

In spotlight:
Outokumpu stainless steel mill in Tornio

Sustainable supply chain
Towards carbon-neutral warehousing

PESMEL

Contents

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Automated warehousing

– efficient and sustainable logistics in action

The cornerstones of enterprising, regardless of business, should be providing safe, reliable and sustainable products and services. This magazine highlights Pesmel's solutions for the metal industries that have been designed from outset to be safe and dependable with the goal of improving operational efficiency while reducing the environmental footprint.

Carbon neutral warehousing is possible with an automated storage and energy recovery system which, when used with solar panels for renewable energy supply, can produce more energy than it uses. Reducing the environmental impact of warehousing makes a notable difference to the logistics chain and the overall sustainability of business operations.

As the trend of replacing manual operations with automation progresses, the correct IT integration are the keys to fluent material flow. Pesmel's proprietary warehouse management system (WMS), coupled with their high-bay storage, offers excellent opportunities to improve management of the entire supply chain. It enables simultaneous monitoring and running of several complex systems and is designed to make in-mill logistics and supply chains simple and effective.

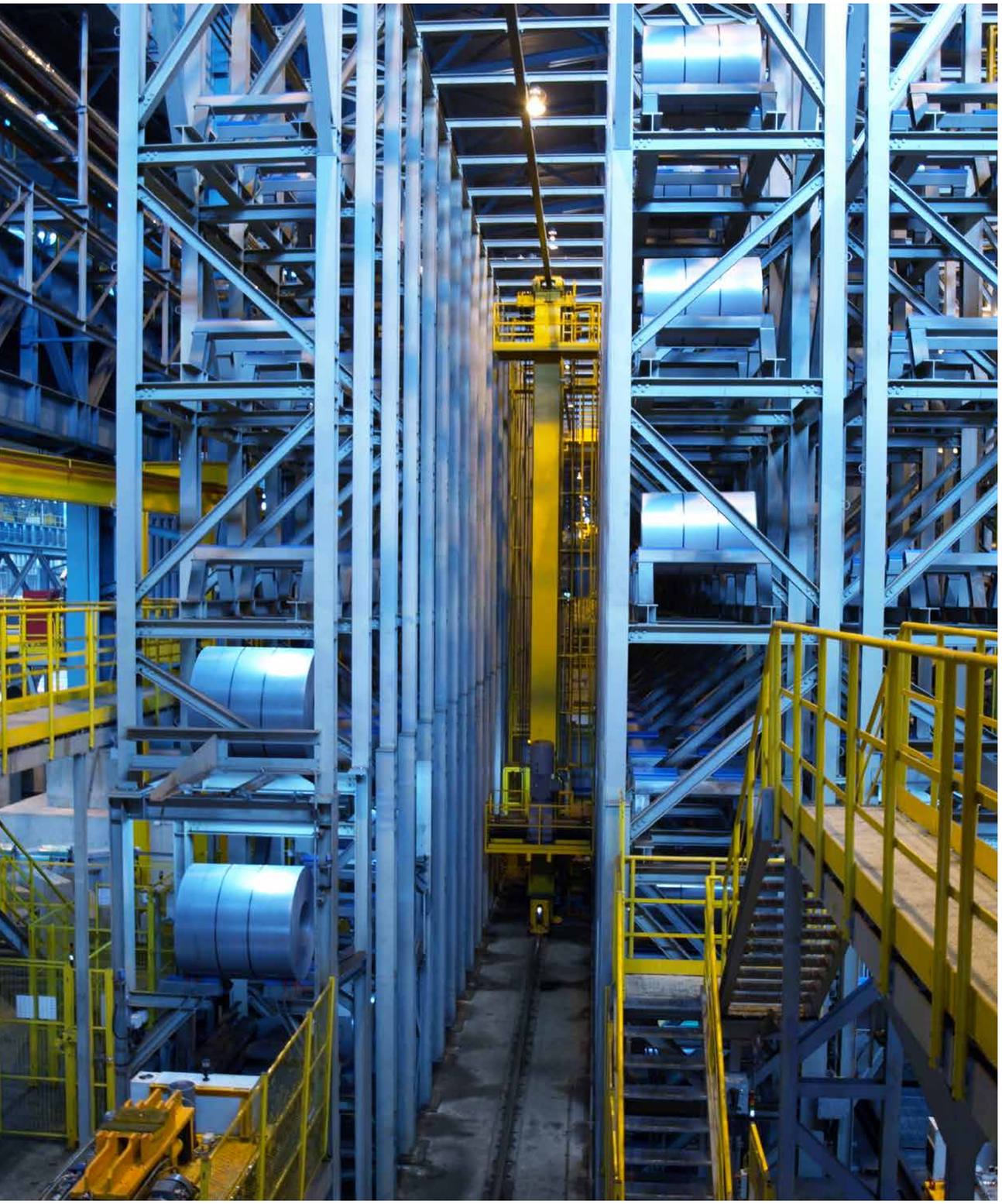
The single piece of software displays the warehouse's activities via a user-friendly interface and makes the overall system status easy to understand, reducing downtime and enabling prompt diagnosis of material handling equipment performance.

The implementation of digital twin technology in warehousing and in-mill logistics processes of a functioning steel mill has potentially positive implications across the mill's lifecycle, from planning and commissioning to uninterrupted operations and smart maintenance planning.

To get acquainted with above topics and more, please, browse through this magazine or go online at Pesmel.com

Looking forward to talking to you more,

Juha Suksi
Vice President, Metals



Pesmel’s Material Flow WMS

manages the mill’s material flow

The main task for the warehouse management system (WMS) is to control mill’s material flow and optimise storage and logistics operations. It is an integral part of our Material Flow How® offering, enabling seamless integration with mill’s enterprise resource planning (ERP) and other production control systems.

Pesmel’s Material Flow WMS is built completely in-house using industry standard technologies. It enables optimal material flow and logistics, and it is an essential part of a fully automated high-bay warehousing solution. The WMS manages material flows from production to dispatch, inclusive of any intermediate warehousing requirements. It gives real-time, accurate inventory management, traceability, and on-time deliveries. Complex material flows with multiple product types require dedicated control systems.

“Our Material Flow WMS can handle demanding material flows with high number of stock keeping units, large product variations, volumes, and high capacities.”

Juha Maunula, ICT Product Owner

“Our Material Flow WMS is customized according to the needs of each mill. It can handle demanding material flows with high number of stock keeping units, large product variations, volumes, and high capacities,” says **Juha Maunula,** ICT Product Owner, Pesmel ICT Engineering.The WMS can be fully integrated into the mill’s existing network and upper-level control systems such as manufacturing execution system (MES) and ERP. “The WMS is at the heart of our fully automated high-bay warehouse solution. We provide our customers with a system that connects to their ERP and upper-level functions so that our software can specify all required warehouse functions,” explains Pesmel Sales Director **Samu Rantala.** “It serves as a single point for other systems to integrate, simplifying the overall architecture of the facility.”

Besides warehouse functions the Material flow WMS is capable of controlling third-party material handling equipment such as conveyor systems, automated guided vehicles, overhead cranes, and forklift trucks. The single piece of software displays the warehouse’s activities via a user-friendly interface. It makes overall system status easy to understand, reducing downtime and enabling prompt diagnosis of material handling equipment performance.

“We have had situations where the customer needed a system to handle the material flow process from warehouse infeed all the way to processing lines with precise timing constraints”, Juha says. “To facilitate the flow, several handling devices and two automated high-bay warehouses were required, all from different vendors. The customer wanted a single system to control all the equipment and, consequently, chose Pesmel’s WMS as it can handle such complex material flows integrating third-party hardware, too. What comes to the hardware, Pesmel was selected to supply the larger of the two high-bay warehouses at the site.”

“Pesmel’s Material Flow WMS can handle complex material flows integrating third-party hardware.”

Pesmel’s digital twin working as a development engine

At an early stage of a customer project Pesmel creates a simulation model which eventually develops into a digital twin. Part of the WMS, it is a virtual representation that serves as the digital counterpart of a physical process. Samu notes that demonstrating the customer animations and simulations of the warehouse “gives them confidence that the WMS software meets, or even exceeds industry standards.”

Digital twin can be used in daily operations: continuous optimization of automated storage, estimation of near future occurrences and support for operator decision making. It also plays an important role in planning and executing long term operations. These typically include data collection of equipment usage, preventive maintenance, and virtual testing of software updates. In addition, the digital twin is used effectively in commissioning, shortening the time used in the start-up phase. The WMS environment has already been represented virtually by the digital twin prior to the start of commissioning.

“Choosing us as a one-stop-shop solution provider removes the need for third-party involvement. The key is seamless integration with either an existing, or totally new software environment.”

Samu Rantala, Sales Director

Continuous support build confidence

Customer’s confidence is built on continuous and close cooperation from the beginning of the delivery project throughout the process life cycle. “We introduce our development specialists to the customer’s own IT team. This makes it evident that choosing us as a one-stop-shop solution provider removes the need for third-party involvement. The key is seamless integration with either an existing, or totally new software environment,” explains Samu.

Juha adds that “we work with our customers to have an efficient implementation of all control software. This includes project support, post-commissioning and start-up. We make sure our customers are comfortable in running their system before we leave the site.”

When operational, the customer’s new warehouse solution is supported by Pesmel’s service team. The 24/7 HelpDesk assists in solving any operational issues, specialists also provide remote access when needed. Furthermore, Pesmel is fully committed to developing its solutions and, in addition, all deliveries can be modernized or updated. Software upgrades keep them relevant and can provide new functionalities.

The road ahead

Pesmel is committed to continuous development of its entire offering. The years of development of the Material Flow WMS software has provided Pesmel with knowledge and experience that benefits both Pesmel and the customer. Successful implementation of demanding projects in particular, have been valuable in view of further development of software solutions.

“There are plans for future development of the digital twin, especially when it comes to production and operator decision-making. We’re looking into how it could predict and simulate the future. There are also different initiatives based on artificial intelligence to boost circular economy and to reduce machine wear and energy consumption,” Juha says.

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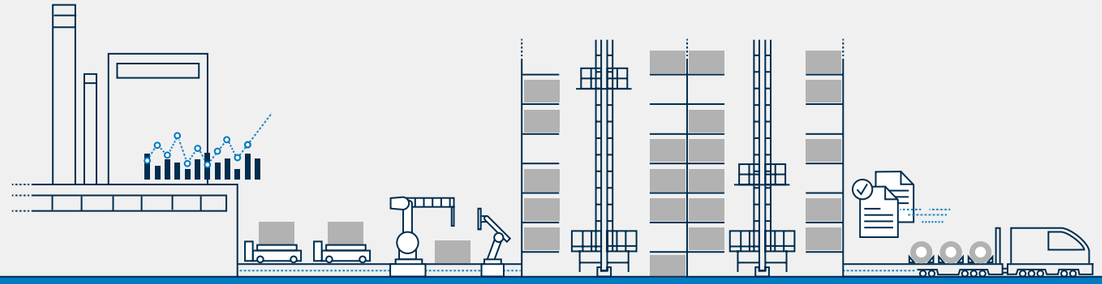
Simplified and intelligent material flow – the Pesmel approach

Manufacturing or distribution management
Production data
Order information

Warehouse Management System
Inventory management
Material flow management
Order picking
Shipment and loading plans

Logistics management
Identification
Waybills



Pesmel Material Flow WMS features

- Warehouse management
  - Inventory
  - Real-time tracking
  - Identification
- Material flow optimization
  - Advanced rules for warehouse de-fragmentation to increase fillrate
  - Intelligent workload balancing
  - Order preparation
  - Infeeding
  - Outfeeding
- Connectivity
- Management of material handling equipment
- Integration to mill information systems
- Integration to production lines
- Graphical user interface
- Reporting
- Monitoring
- Alarms

Knowledge creates value

Real-time tracking with Pesmel's warehouse management system WMS is about much more than just knowing exactly where every coil is located. Compared to traditional warehousing solutions, the benefits available with Pesmel's high-bay warehouse inclusive of Material Flow WMS can be measured in quality, efficiency and speed.

The real-time tracking feature is based on creating a data model of the warehouse. Every movement is recorded, providing an up-to-date view of all operations. As every coil is automatically recorded in the system upon entry, the reliance on hand-made markings or barcodes attached to the coils is redundant. In fact, the coils do not necessarily need to be marked at all for the purpose of identification during storage.

"When you elevate your thinking from the day-to-day benefits to the lifecycle ones, it all starts adding up."

Quality – A common constant priority

Business revolves around the quality of products and processes. Every time a coil is handled while in storage the risk of damage is present. When goods are clamped, it inevitably leaves some kind of a mark. The Pesmel logistic solution not only minimizes the number of times a coil is handled during storage, but the automated coil cars also treat valuable materials with care, lifting them gently from below.

Also, having full real-time visibility into the stock held in an automated high-bay warehouse helps ensuring or improving another kind of quality – the quality of customer deliveries. The expenses related to shipping out incorrect product to customers is two-fold. There is the expense of handling returns and reclamations related to heavy and valuable products sent incorrectly around the globe, but there is also the damage to reputation of mishandled shipments that should be considered. The transparency and traceability of a WMS helps ensure only the right products get sent out.

Efficiency - Work smarter, not harder

The real benefits of Material Flow WMS operating a fully automated storage facility come from improved efficiency. A vast amount of time is wasted in traditional manually operated coil storage yards trying to identify and locate coils. There may be several people per shift looking for coils that need to be further processed or shipped out. That is means potentially hours of wasted time for the plant each day, compared to relying on a solution with real-time tracking capabilities and no extra labor-related costs.

Investing in a smart and fully automated warehousing solution not only reduces labour costs over time, it also allows for foresight that helps optimize operations. This can mean, for example, utilizing less busy periods of time to sort and prepare the warehouse for upcoming outward shipments. Coils destined for shipment can be moved closer to the loading bay in advance, improving turnaround time and efficiency of outbound truck traffic on-site. With the WMS in operation, shipments can be handled 24/7. The system works through nights, weekends and holidays without breaks.

"The benefits of this kind of data-driven foresight extend beyond the warehouse."

The benefits of this kind of foresight and predictability extend beyond the warehouse. Exact knowledge of all product locations combined with customer order data can help with the planning and optimization of production as well.

Speed – Availability at the right time

With smart warehousing solutions, it is possible to increase handling volume, reduce handling times, and minimize errors. Integration of warehouse data with shipping data, for instance, allows for coils destined for pickup to be positioned near the truck loading bays, speeding up the despatch process significantly. A smart logistic solution based on an automated warehouse can help reduce crane travel per coil by several hundreds of meters. This also helps save energy and improve the sustainability of processes by eliminating the need for fuel-powered forklift trucks altogether.

When clear visibility into stock is paired with smart automated stacker cranes and advanced sorting, any coil in the storage can be available for shipping in three minutes, compared to typical values of 30 minutes or more in conventional yard-type warehouses.

When calculating the potential time savings over a day, week or year, the benefits of investing in smart high-bay warehouse solutions and advanced automation across the entire supply chain become evident.

Long-term and short-term benefits

Automated high-bay warehousing managed by a WMS with integrations to production, packing and logistics data is a considerable investment. But this is when both the day-to-day benefits and the long-term payoff of the investment should be factored in. The real-time tracking of inventory inside the warehouse ecosystem creates savings every day – reducing damage to goods, handling times, labour costs and harm to brands and reputation. Overall, when elevating the perspective from the day-to-day to the lifecycle benefits of such a solution, it all starts to add up.

Even if taking a conservative stance on the savings, calculating the 20 minutes or so of handling time per coil for the total number of coils getting shipped each year, the implications of improved efficiency start becoming evident. When adding savings on man-hours over the operational lifecycle into the equation, The ROI and pay-back time for an investment such as this will become surprisingly short, typically four to seven years.

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Total cost of ownership

Example mill 1 million metric tons' production, 1,500 coil storage

Parameter	Automatic High Bay Storage	Automatic EOT Floor Storage	Manual EOT Floor Storage
Equipment/construction	Required area 10,000 m² 2 stacker cranes 2 EOT cranes Coil cars WMS	Required area 25,000 m² 6 EOT cranes Bay to bay transfer Cars YMS	Required area 25,000 m² 6 EOT cranes Bay to bay transfer Cars YMS
Construction (civil, structure, building)	USD 25M	USD 30M	USD 30M
Equipment	USD 12M	USD 14M	USD 8M
Equipment and construction total	USD 37M	USD 44M	USD 38M
CAPEX/metric ton	USD 1.48	USD 1.76	USD 1.52
OPEX/metric ton for 25-year lifetime	USD 0.30	USD 0.65	USD 1.39
Savings over the course of the 25-year lifecycle	**USD 28.25M**	**USD 12.5M**	**Reference**

CAPEX: Stacker cranes, coil cars, other equipment, racking, cladding, other building construction, and civil works
OPEX: Manpower, electricity, utilities, lifetime service incl. maintenance, spare parts, and upgrades

Pesmel to supply automated storage and hot rolled coil logistics solution to Hindalco Industries

Pesmel and leading aluminum manufacturer Hindalco have agreed on the configuration and delivery of an automated storage and retrieval system for hot rolled aluminum coils for its aluminium facility in Odisha, India. The solution is the first of its kind and is expected to become operational in 2025.

The delivery comprises an automated high-bay storage with a rack-supported building containing 392 effective coil storage places. The delivery also includes one digitalized automatic stacker crane and four in-feed/out-feed automatic coil cars, with a maximum capacity of 10 coils per hour, both in and out respectively.

The unique solution for handling hot coils of up to 350°C will have a dedicated cooling system comprising 220 cooling positions with fans. “We offered individual dedicated fans for the coils, with energy savings and control per mutual discussion per preference of Hindalco,” comments Juha Suksi, VP Metals at Pesmel.

Coils produced Hindalco’s Hirakud FRP (Flat Rolled Products) plant in Odisha in Northwestern India, with a maximum weight of 22 metric tons per coil, will be cooled to 60°C within 37 hours.

Hindalco selected Pesmel’s rack-supported Automatic Storage and Retrieval System (ASRS) outside the existing building to augment storage capacity for aluminium coils. The customer’s initial idea was to install an ASRS inside the building. However, height and length limitations restricted storage capacity.

“We proposed a rack-supported building outside to store more coils, which was the solution that the customer finally selected,” Suksi explains, adding that the rack-supported building is the most cost-effective solution.

Pesmel has been involved with the project since its beginning in 2018. Pesmel has already supplied two coil packing lines to Hindalco and has existing vertical storage references in India.

“We have gained the trust of our customers by providing them with future-oriented solutions backed by strong support,” concludes Jagannathan Rajagopalan, MD, of Pesmel South Asia. •

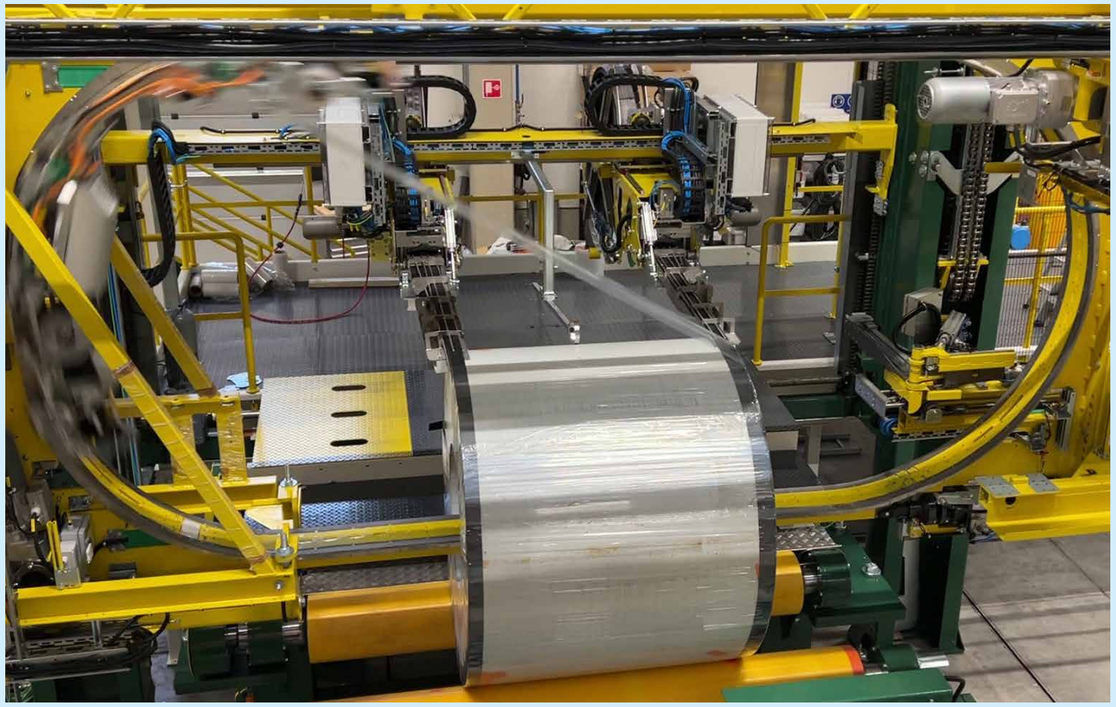
Novelis chooses Pesmel coil packing line

Novelis, a leading sustainable aluminum solutions provider and the world leader in aluminum rolling and recycling, has chosen Pesmel to provide a compact coil packing line for their new U.S. aluminum rolling and recycling plant being built in Bay Minette, Alabama. The plant is expected to begin commissioning in the second half of 2026.

The 600 kilotonnes plant will primarily support the beverage packaging and automotive industries, with flexibility for specialty products production. The plant will also have the capacity to recycle approximately 15 billion used beverage cans annually. Pesmel’s packing line comprises automatic through-eye wrapping system (TEW) with stretch film and outer edge protections, and automated palletizing with top disc inserting, strapping, and labelling. Continuous wrapping is guaranteed for several hours with automatic stretch film changing device. Two sledges allow wrapping with two materials simultaneously when required.

Novelis selected Pesmel’s TEW machine as it could be fitted to limited space with height of just 7.5 meters. Wrapping of large diameter coils is carried out using a side movement due to the height restriction. “We are delighted that we’ve got Novelis’ first contract in the U.S. and look forward to future cooperation,” says Juha Suksi, Pesmel VP, Metals.

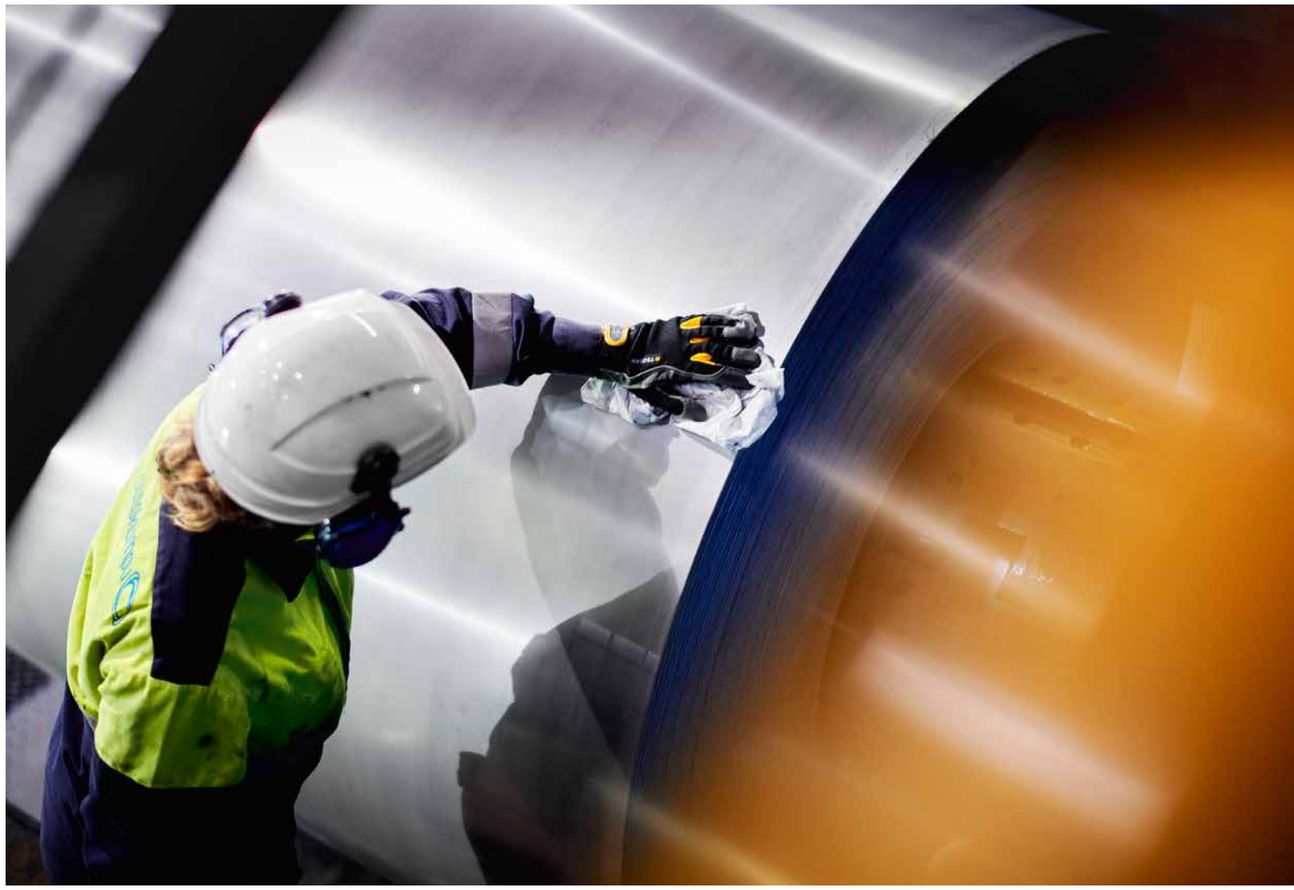
Forward-Looking Statements
Statements made in this news release that describe Novelis’ intentions, expectations, beliefs or predictions may be forward-looking statements within the meaning of securities laws. Forward-looking statements include statements preceded by, followed by, or including the words “believes,” “expects,” “anticipates,” “plans,” “estimates,” “projects,” “forecasts,” or similar expressions. Examples of forward-looking statements in this news release include expectations to begin commissioning the plant in the second half of 2026. Novelis cautions that, by their nature, forward-looking statements involve risk and uncertainty. Novelis does not intend and disclaims any obligation, to update any forward-looking statements, whether as a result of new information, future events or otherwise. Important risk factors which could impact outcomes are included under the caption “Risk Factors” in Novelis’ Form 10-K filed with the Securities and Exchange Commission for the fiscal year ended March 31, 2024, and as the same may be updated from time to time in Novelis’ quarterly reports on Form 10-Q, or in other reports which we from time to time file with the SEC.



In spotlight: Outokumpu Tornio

Collaboration with an innovative approach

Finnish stainless steel manufacturer Outokumpu's mill in Tornio, Northern Finland, is a facility with two melt shop lines, a hot rolling mill, a cold rolling plant, brushing and polishing lines and slitting and cut-to-length lines. The facility originally took delivery of high-bay coil and sheet storage systems from another Finnish company, Pesmel, way back in 1997. This delivery was preceded by the first coil packaging line in 1996.



Pesmel describes itself as a material 'flow how' specialist and boasts over 45 years of experience developing over 600 fully automated systems designed to improve material flows and logistics efficiencies for the paper and pulp, metals and tire manufacturing industries.

In 2003 Outokumpu installed a RAP-5 line which was integrated with a single high-bay storage facility.

Advanced warehouse solutions

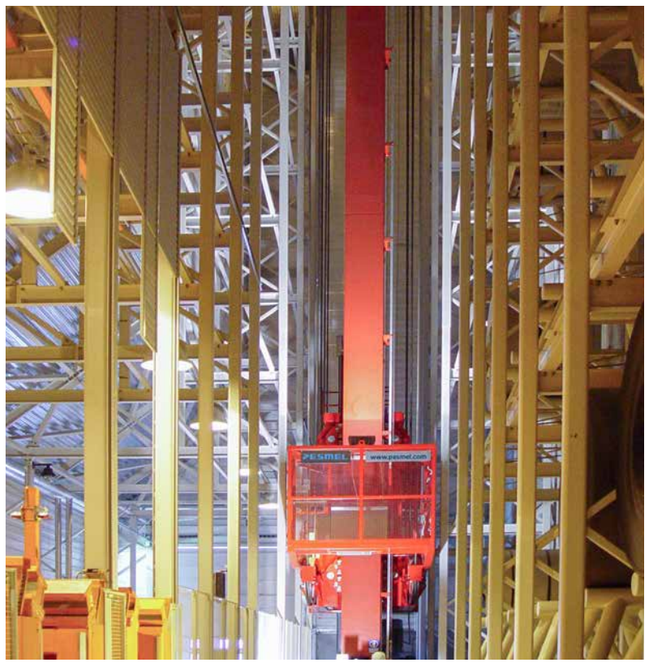
Pesmel's presence at Tornio consists of a totally automated logistics system comprising hot coil handling, sheet packing line and several coil packaging lines, conveyor systems and high-bay storages with automated sorting, storing, and dispatching.

Outokumpu's enduring and fruitful relationship with Pesmel started in the mid-90s when the former made history when it took delivery of two automated computer-controlled high-bay storages with handling systems for stainless steel coils and sheet. Coil storage is serviced by three stacker cranes whereas sheet storage is handled by five stacker cranes. The facility works as a shipment center for finished products.

In 2003 Outokumpu installed a RAP-5 line (RAP standing for Rolling, Annealing and Pickling) which was integrated with a single high-bay storage facility. This system takes care of all material handling within the mill's rolling processes and boasts a length of 500m, a height of 30m and a width of 7.5m; it is capable of handling 2,000 coils be they hot or cold-rolled, finished or packaged products ready for delivery. All RAP-5 operations are managed fully automatically by three stacker cranes and 10 transfer cars. Infeed and outfeed areas are located at opposite ends of the storage and the stacker cranes handle both incoming black coils and outgoing finished products.

Pesmel lists many benefits of its Material Flow How® concept, claiming first and foremost that modern logistics systems improve plant safety as there is reduced human contact with the products and, therefore, less chance for accidents to occur. Full automation also provides the obvious advantage of less handling damage and full control – meaning no lost products, and no delivery errors.

The focal point of Pesmel's Material Flow How® process is its warehouse management system (WMS), a suite of software developed in-house. You could say that the WMS is the brains. The first WMS was delivered to Outokumpu in Sweden in 2009, but since then it has been extensively upgraded in-house by Pesmel and it is the very latest software that is operational at Tornio today.



Innovative packaging systems
In 1996, Pesmel delivered coil packing line to Tornio mill, which was the company's very first packaging line for the metal industry and served as a trailblazer for other similar systems. Coil packing line was followed by fully automated sheet packing line delivery in 2001. The packaging line has only one operator working from inside a control room and is claimed to be user friendly with downtime kept to a minimum thanks to a malfunction detection system.

The packing lines have low operational costs due to minimized manual work and energy savings.

Also in 2001, the steelmaker added a 'through eye wrapping' system otherwise known as a TEW system. This was 'made to order' by Pesmel for Outokumpu on the company's request. In fact, between 2001 and 2003, the Finnish stainless steel company took delivery of three TEW packaging lines designed for eight hours of uninterrupted packing thanks to a 12-place automated film roll changing magazine.

The packing lines have low operational costs due to minimized manual work and energy savings. Automated lines can also achieve faster material turnover than manual packing with savings on packing material consumption. Operator safety is further enhanced by using environmentally friendly materials.

Proof of material flow performance
Over the years, Pesmel has been engaged in many different projects at Outokumpu Tornio (at least 17) and there have been many upgrading exercises too, including the latest steel coil and sheet storage upgrade that was started in 2021 and was completed last year. This particular upgrade looked at general wear and tear as the controls have a limited lifetime, and software updates. Tornio's original steel coil and sheet pallet cranes are now 25 years old and still going strong.

Outokumpu's Tornio plant has become a worthy show case for the Material Flow How® specialist as many potential customers visit the site prior to purchasing their own high-bay system. Pesmel stresses that it has sold 'quite a few' systems globally as a result.

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How Outokumpu makes Stainless Steel

Finnish stainless steel manufacturer Outokumpu mines chromite ore from its 1000m deep mine in Kemi and transforms it into stainless steel at its nearby Tornio mill. The Kemi mine is just 25km from the mill.

Chrome is added to steel to make stainless steel and the Kemi mine, says Outokumpu, is the only place in the European Union where Chromite ore can be found. Tunnels are cut into a seam of ore and explosives are used to bring it down. The ore is then crushed at the bottom of the mine and brought to the surface where it is crushed again and processed into lumpy ore, fine concentrate and pellets before it is transported to Outokumpu's Tornio mill where the material is formed into pellets and mixed with the lumpy ore in the company's ferrochrome smelter where molten ferrochrome is produced. When it cools to the right temperature, it is poured into ladles. Slag forms and is cooled down and skimmed off; and once cooled down and crushed the slag can be used to build roads as a sustainable alternative to gravel.

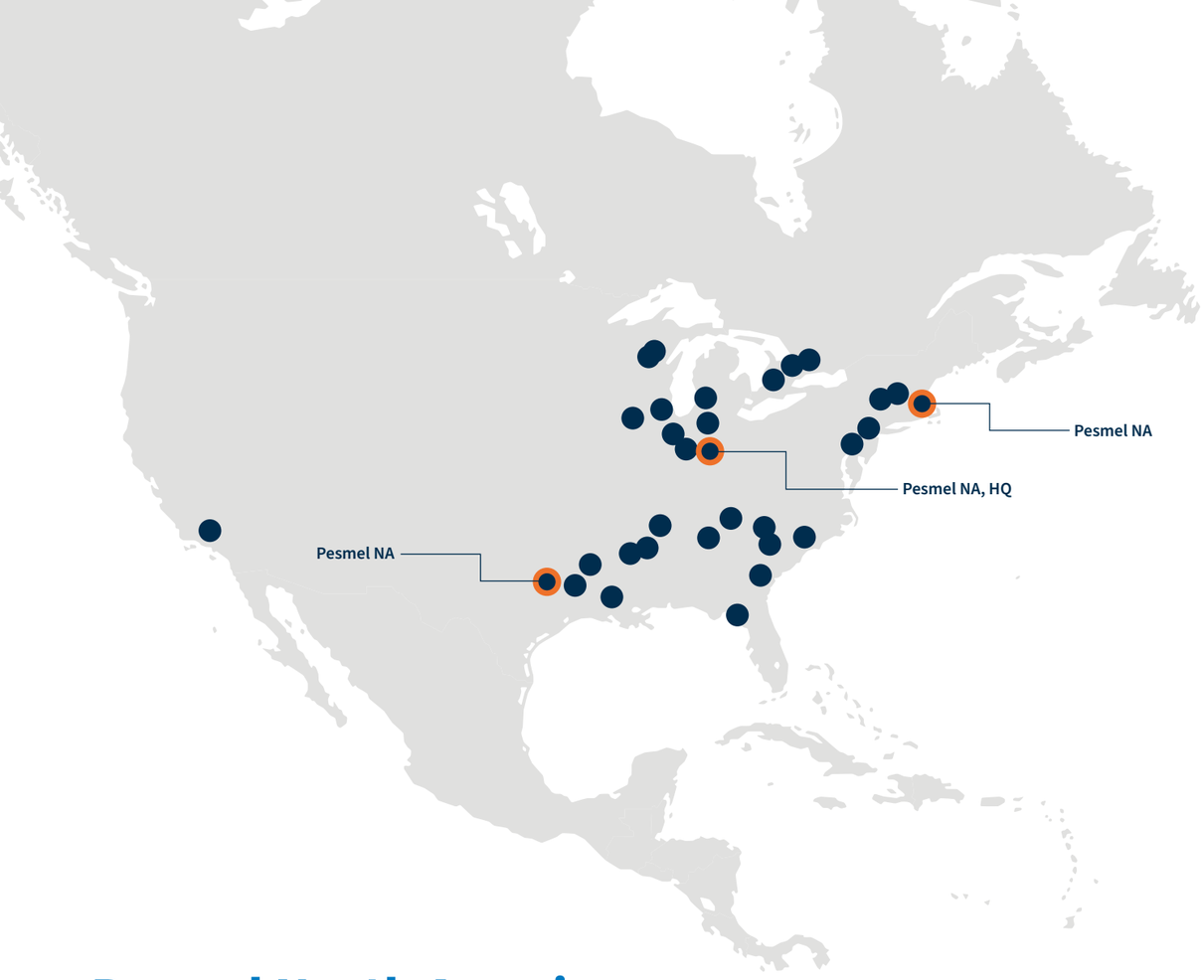
Molten Ferrochrome is taken to the melting shop and is ready to be used as an alloy to produce stainless steel. Using molten ferrochrome not only saves energy, but also increases production capacity. Recycled steel makes up most of the raw materials needed and is melted in Outokumpu's electric arc furnaces along with other raw materials at temperatures exceeding 1,600 deg C. Melted steel is mixed with molten ferrochrome, the alloying is adjusted to create the stainless steel specified by the customer. Final adjustments to the melt are made during the ladle treatment phase and the molten steel then moves forward to the continuous casting phase where it is cast and cut into slabs that measure around 14 meters in length and weigh up to 26 tons.

Each slab of stainless steel produced has its own special code to identify the order and the customer and is then moved along the line to the hot rolling mill while still hot and is reheated to 1,200 deg C. The width of the product remains the same but the stainless steel becomes thinner until it is transformed into long strips.

When the strips of stainless steel are thin enough, they are coiled and cooled ready for cold rolling in two buildings at the Tornio site; one of these buildings is over a kilometer in length and has the claim to fame of being the longest building in Finland. When coils emerge from the hot rolling mill they are covered in black scale.

In Tornio's cold rolling plant the stainless steel is uncoiled and passed through an annealing and pickling line which removes scale and changes the surface from a dull black color to a silvery grey. Annealing is when the stainless steel is heated to improve its formability. The pickling process treats the steel with acid to remove scale and the steel band is then rolled to the customer's required thickness before being annealed and pickled again and then rinsed in water. Finally, the now shiny and flat product is cut to size and shape either as coils or sheets depending upon customer requirements. It is then packed and loaded on to trucks, trains and ships.

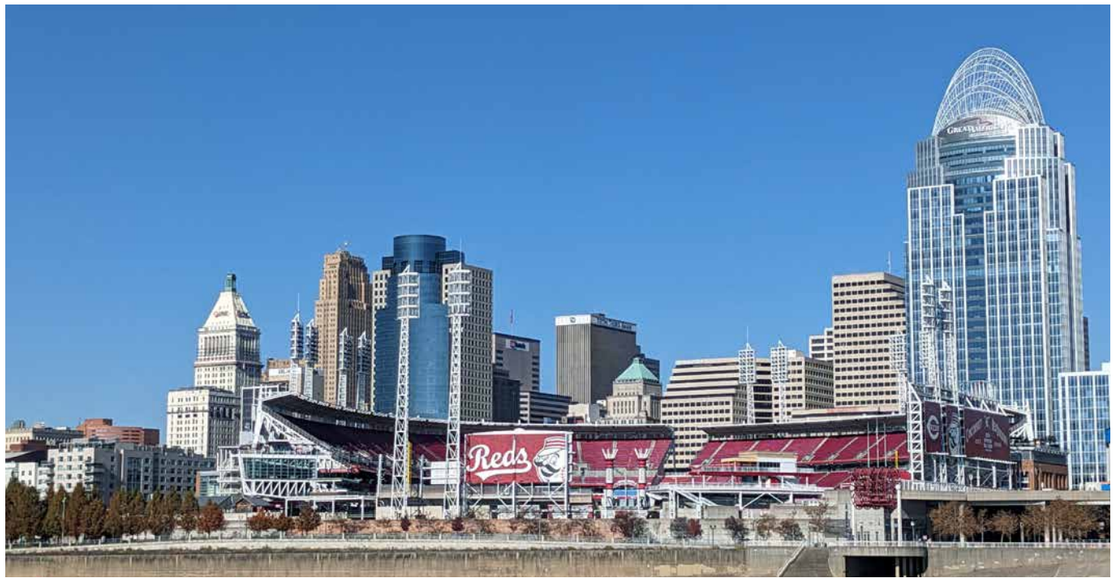
In Tornio, the sea port is located at the Outokumpu plant area. It is here that raw materials arrive for processing into stainless steel and where stainless steel and finished products are transported to customers around the world.



Pesmel North America

Intelligent warehouse automation for American steel and aluminium industries

Since 2007, when Pesmel North America was established, the company has seen significant growth in market share in the USA and Canada. The North American market is a strategy-based focus area for Pesmel's automated warehousing and in-mill logistics. For the metal industry, Pesmel pro-actively promotes its material handling knowhow to those corporations that have the need, means, and vision to invest in innovative and modern solutions.



Developing potential and first-class services

Pesmel's North American Head Office is based in Cincinnati, Ohio, a major hub for traffic around the continent. General Manager **Samu Rantala** heads a five-strong team, in charge of developing the market. "Cincinnati is a perfect location for our North American Head Office," he says, "with a strong local steel industry and good connections around the country."

Originally, Pesmel's presence in the USA was based around a single workshop in 2007, which became a spare part and maintenance unit in 2012 as manufacturing was centralized to Finland. Today, North America is one of the most important market for Pesmel with strong plans for growth. Experienced Pesmel specialists from Finland and the USA work with local contractors to supply automated material flow solutions from California to Toronto.

"We have noticed that investment in American industry has been increasing," says Rantala, "and our solutions can be part of the resulting improvements to infrastructure and working methods. Consequently, there is great potential for growth for our material handling solutions here in North America.

Cincinnati office representation (left to right): Samu Rantala, Juha Luhtala and Stan Merrill

International growth with scalable solutions

Most of Pesmel's customers in North America are international, including many of the world's leading steel and aluminium companies as well as pulp and paper producers. As an international provider of advanced material flow solutions, Pesmel's global reach and expertise can be leveraged to support their innovation and development.

As part of the company's commitment to customer service, a 24/7 helpdesk is operated to provide support for all Pesmel devices and systems, including troubleshooting of automation software and warehouse management systems. Depending on the customer contract, a response can be guaranteed within a few minutes from

"We have completed over 30 deliveries in North America."

contact. An expert duty officer provides immediate advice on any issues that have arisen and can contact field specialists in various disciplines for consultation if required. The service makes it easy to secure continuous production and releases the customers' own resources for other assignments.

For the North American metal industry, Pesmel provides scalable and customizable solutions that greatly improve efficiency and quality through automated warehousing, packing and in-mill logistics. "Our unique, proven solutions fill a gap in the market," Rantala explains. "In particular, our high-bay automated warehousing significantly improves OPEX over the long system lifecycle. So far, we have completed over 30 deliveries in North America, and we look forward to many more satisfied customers in the future. The market has accepted our automated material flow solutions really well"

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Pesmel service

Full service support

For our customers, choosing Pesmel's automated warehousing solutions is only the first step in a long-term partnership that extends throughout the process lifecycle. Pesmel customer support provides services that keep the material flow moving.

Expert services for cost-effective success
There are many things to consider when modernizing warehouse logistics. Not only is it essential to take advantage of the most modern solutions that Pesmel offers, but it is equally vital to ensure the long-term reliability and success of the chosen system while meeting financial requirements. Pesmel customer service guarantees performance in material handling, packing and storage systems, mechanical and electrical works, and PLC and ICT control systems.

The key to long-term reliability is an open and flexible approach.

Our specialists are focussed on bringing peace of mind to our customers. With expertise covering every part of Pesmel's offering, they keep customer's Material Flow How® solutions moving and optimizing overall investment and operational costs. The key to this premium service is an open and flexible approach backed up by the utmost professionalism. Pesmel experts are available on-site – for example during scheduled shutdowns – or remotely via the HelpDesk.

Pesmel's Material Flow How® performance services consist of five key areas:

Modernizations and upgrades
Modernizations extend the life of the current system and equipment, eliminating the need for costly new investments. Our experts know material handling systems inside out, and perform constant development work on our solutions. This can also be applied to existing systems through modernization upgrades.

Together with customers, we plan improvements for the optimal rebuild solution. If capacity needs to be increased or the process otherwise upgraded, we submit relevant plans and designs and implement the agreed changes.

WMS application maintenance
A continuous development contract ensures specialist Pesmel support for trouble-free operation of its delivered WMS (Warehouse Management System) and YMS (Yard Management System).

We ensure that mandatory updates are aligned with platform systems, and take care of regular platform database maintenance to ensure the customer receives the latest software versions. Experts also perform continuous WMS database health checks to ensure swift and accurate information usage. We also offer training and cloud-based database backups if required.

HelpDesk
Pesmel provides contract customers worldwide with a 24/7/365 HelpDesk service via phone and remote connection. This service covers troubleshooting of PLC, WMS, and YMS systems whenever urgent issues arise to ensure device and systems performance.

Our HelpDesk specialists support trouble-free operation and ensure reliable performance of processes and equipment in acute situations. Service is provided in English and Finnish.

Preventative maintenance
Regular preventative maintenance ensures trouble-free, peace-of-mind operation of processes and maximizes system efficiency. Our experienced personnel make regular site visits for condition monitoring and adjustment of mechanical devices, sensors, and electrical components.

Pesmel's maintenance program also includes complete system health checks, with future maintenance requirements planned together with the customer.

Spare parts
Pesmel's customer support program has a comprehensive spare parts service. We provide both tailormade spare parts manufactured using our engineering blueprints and third-party components. New spare parts help guarantee reliable operation, reduce the risk of unexpected downtime, and extend the life of supplied systems.

The future of warehousing is carbon-neutral

Pesmel's automated warehousing solutions do not just increase efficiency and productivity. They are also an integral part of the company's comprehensive carbon-neutral solution for sustainable intralogistics.

For over 40 years, Pesmel has been providing customers with many benefits such as improved energy efficiency, shorter turnaround times, and space optimization. Today, the unique high-bay automated storage and retrieval system (ASRS) also allows the establishment of carbon neutral warehousing, improving the overall sustainability of customer's operations. Because warehousing and logistics are a key element of any steel supply chain, creating carbon neutral warehousing and logistics has a big role to play in reducing the environmental impact.

"Pesmel's unique high-bay ASRS allows the establishment of carbon neutral warehousing."

Examining the possibilities

To fully understand the contribution that can be made with sustainable warehousing, Pesmel prepared a new climate impact summary examining the carbon footprint of Pesmel solutions. An ASRS of a mid-sized CRM (Cold Rolling Mill) complex producing 1,000,000 metric tons annually with two stacker cranes and a lifecycle of 40 years was evaluated. The life cycle greenhouse gas emissions of this scope of supply were calculated at just under 18,000 metric tons of CO_2e, the majority of which comes from two sources – the steel required for manufacture and the operational energy consumption. The calculation includes materials, manufacturing, use of the system, and disposal.

Steel is the main material used in ASRS, making up approximately 95% of all materials in the racking, cladding, and stacker cranes. In our example, this amounts to about 2,100,000 kg of steel. The rest consists primarily of mineral wool and zinc for cladding, and fuel used during installation. Although the production of steel requires significant energy outlay, it holds an important position in the circular economy. It is the most recycled material in the world and can be recycled many times without reducing its quality while using only one third of the energy needed to make virgin steel. For every one kilogram of steel that is recycled over the product's life, a saving of 1.5 kilograms of CO_2e is realized.

Sustainable stacker cranes and solar solutions

The other main way in which CO_2 emission reductions can be made is by increasing the energy efficiency of the ASRS. The ultimate goal is to create a solution whereby more energy is produced than consumed. For many years, Pesmel has included regenerative drive technology in stacker cranes as a well-established and easy way to reduce energy use. Included in the standard offering, braking energy is collected and fed back into the power grid. This technology is paired with energy efficient operating devices that are optimized according to usage requirements.

To minimize carbon dioxide emissions, Pesmel recommends the use of rooftop solar panels. As the chart below shows, harvesting renewable energy on-site to meet energy demand makes a big difference, as it nearly covers the CO_2 emissions of energy consumption during operation, assuming the EU's average solar energy potential. The ASRS's electric infrastructure can also be utilized for rooftop solar power grid. The solar energy system can be included by Pesmel as part of the delivery.

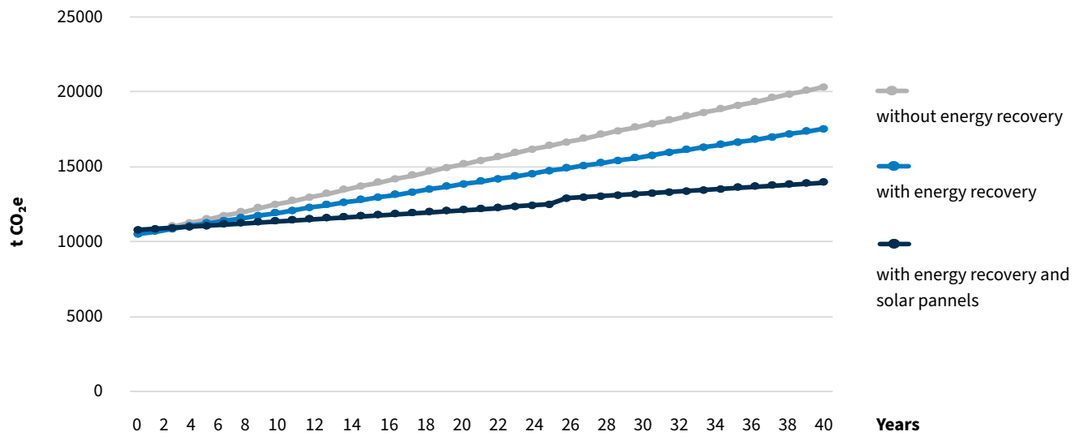
"The ultimate goal is to create a system whereby more energy is produced than consumed."

The climate impact summary showed that using the specified solution results in carbon dioxide emissions per handled tonne of steel of 0.4 kg when solar panels are not installed. With their installation, CO_2 emissions drop by about 25% to only 0.3 kg per handled tonne.

The remaining emissions, representing less than 0.5 percent of the total ASRS investment costs, can be offset using certified emission reduction schemes, such as wind power, solar energy, or forest planting- or protection projects, resulting in a lifetime carbon-neutral warehousing solution.

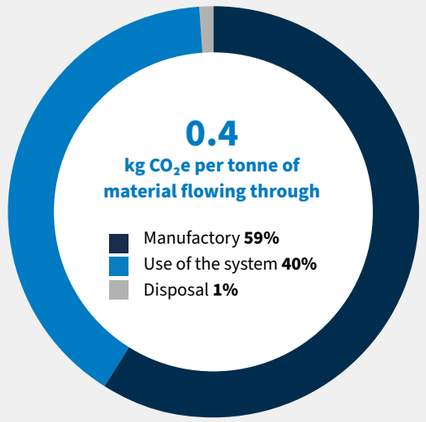
By giving the possibility for carbon-neutral warehousing, Pesmel's ASRS has become an essential part of a sustainable logistics ecosystem.

With solar panel installation, the carbon dioxide emissions in the Pesmel ASRS solution are only 0.3 kg per handled steel tonne.

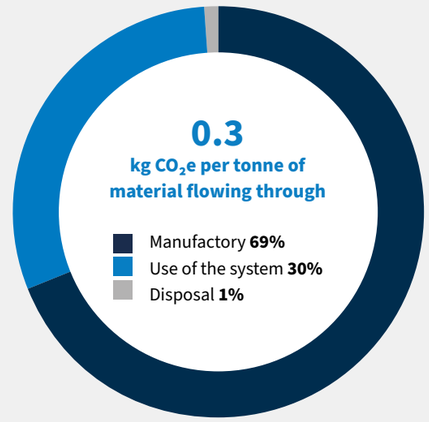


The CO_2 emissions can be only 0.3 kg per handled tonne, mininizing the need for compensation in order to achieve carbon neutrality.

Pesmel ASRS with energy recovery

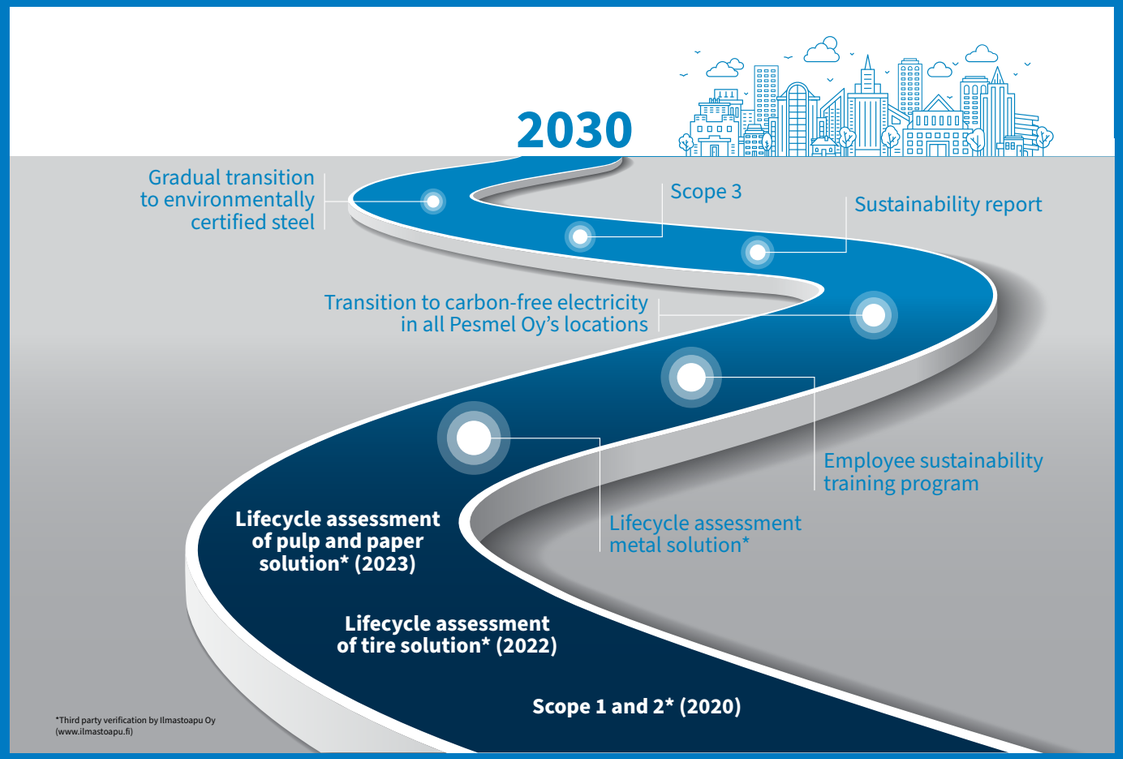


Pesmel ASRS with energy recovery and solar panels



Climate impact over 40-years lifecycle including manufacturing, usage and disposal phases in alternative ASRS solutions.*

***Third party verification:** Streamlined life-cycle assessment verified by Ilmastoapu Oy (www.ilmastoapu.fi)*



On the path to sustainability

As the world changes, so Pesmel changes with it. Meeting sustainability goals is of vital importance throughout the industries we serve, and we are making sure we are staying true to the curve.

Being part of the solution

Pesmel's business is based on providing safe and reliable products and services to our customers. To do so, we constantly develop innovative solutions that improve efficiency while reducing the environmental footprint of our and the customers' operations.

Pesmel's state-of-the-art Warehouse Management System is inherently energy efficient. Carbon neutral warehousing is possible with the Automated Storage and Recovery System which, when used with solar panels for renewable energy supply, can produce more energy than it uses. As a key part of a logistics chain, reducing the environmental impact of warehousing makes a notable difference to the overall sustainability of business operations.

A road map for the future

As part of our commitment to an environmentally friendly future we have established a road map setting out our 2030 targets. In the coming years we will perform lifecycle and sustainability assessments to support those previously conducted, in cooperation with third-party verification organisations. By 2030 we aim to achieve carbon-free electricity in all Pesmel locations and to have fully transitioned to 100 per cent environmentally certified steel.

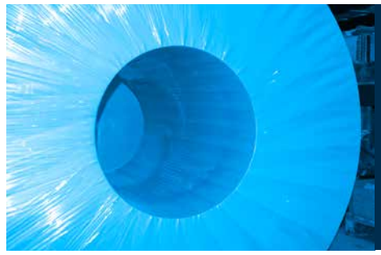
Carbon-free and environmentally certified by 2030.

We have also considered our strategy in relation to the UN Sustainable Development Goals. We have the possibility of contributing in the areas of health and well-being, affordable and clean energy, innovation and infrastructure, and climate action. Our sustainable philosophy leads us to work with and support our suppliers and contractors to likewise demonstrate high ethical standards and comply with our Supplier Code of Conduct.

The nature of Pesmel's business area means that we are in a perfect position to contribute to shared environmental targets. Through identifying areas where further energy savings can be made or renewable and recyclable materials used, we can continue to increase efficiency and productivity in a network of sustainable logistic elements.

Highlights from previous magazines

Below are shortcuts to articles introducing our warehouse automation deliveries to customers. Learn more about real customer cases and the tangible benefits that automated in-mill logistics can provide.

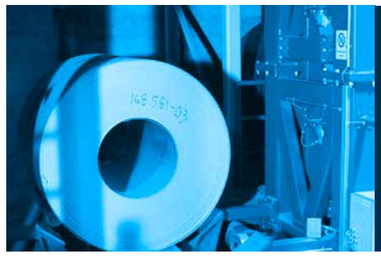


4/2021

Material Flow How® in action at Tata Steel, Kalinganagar

5/2021

Keeping wire rod coils in shape at Danieli's steelmaking division ABS



4/2020

Outokumpu: Ideal Material Flow How® with superb internal logistics

4/2020

JSW Steel: Pioneering improved quality and enhanced throughput

Contact us

If you would like to know more about the topics covered in this issue or have any other enquiries, our experts would be more than happy to help. We would love to hear from you.

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