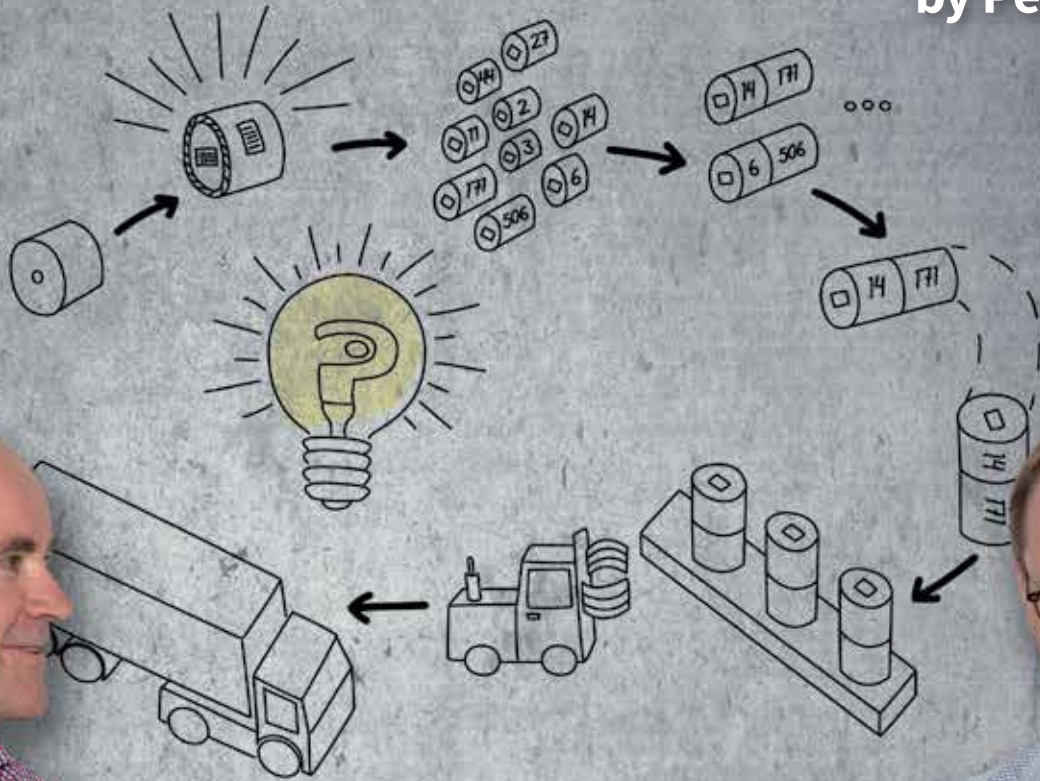


NewsFlow

by Pesmel 2016



Material Flow How

Extensive experience and know-how on material handling

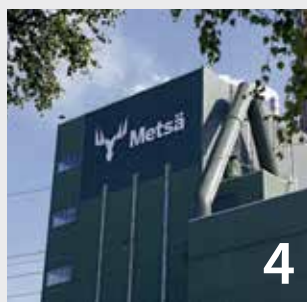
Pesmel and International Paper in cooperation

TransBale
Introducing the new cutting-edge high-bay storage concept

NewsFlow

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TransBale

"The new and innovative solution will attract a lot of interest within the industry," says Matti Alanen, Vice President of Logistics Finland at Metsä Group.

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Pespel FlowCare

Better customer service and more efficient mill operations



Tony Leikas,
President and CEO, Pesmel Oy

Increased efficiency or something else?

Over the last few years, we have been fortunate to be busy resolving a wide range of our customers' challenges related to improving efficiency, grade change or new investments. Even though the projects have been very different and customer-specific, their goals can be summed up as improving efficiency or seeking a new path.

The fact is that continuous development is needed to maintain a healthy business. Recently, we have had the opportunity to be involved in investment reviews more than before – we would like to thank our customers for their activeness in this regard. Being involved has given us a new angle on product development and has made us consider how investments could be refined even more, according to the principle of continuous improvement. As part of this process, we have focused extensively on our new FlowCare software.

In many cases, carefully reviewing investments also highlights individual needs: ideal solutions usually require some customer-specific customization. This is a very natural need because individuality is a global megatrend. For us at Pesmel, this trend is welcome because we have always had our own engineering department and manufacturing unit, which has allowed us to offer individual solutions. Over the last few years, we have further developed and strengthened this in the engineering field, for example in ICT, mechanics, and automation.

All of the above has made our slogan – Material Flow How – come true, and it feels that the best times of our company are only beginning even though we have been in the business for almost 40 years.

I am happy to say that we are ready to meet our customers' challenges – in an individual way.

Tony



Pesmel will deliver a distribution center for Metsä Group's new bioproduct mill in Äänekoski, Finland. The distribution center will be implemented using the new TransBale concept, which has been developed in cooperation with Metsä Group since 2013 and will be the first delivery of its kind in the world.

The world's first automated pulp distribution center to be delivered by Pesmel

The construction of the distribution center will begin in summer 2016, and its commissioning will take place in spring 2017, after which all of Metsä Group's 1.3 million tonnes of pulp production will be distributed through Pesmel's facility. The core of this automated distribution center is high-bay storage with two fully automated stacker cranes. The system buffers and sorts pulp bale units by product type and customer order, and controls all dispatch operations.

An innovative, all-inclusive delivery

Compared to typical high-bay storage that uses a pallet racking system with several stacker crane aisles where only two pallets can be stored in each, TransBale is deep-lane storage where six pulp bale units can be stored in each storage channel. This makes it possible to store larger amounts of material in a smaller space. The pulp bale units are stored on steel C profiles, and the shuttle car moves the bales from the bottom, which is gentler than the

typical way of moving them by the steel wire that holds the bale units together.

Pesmel's delivery includes the following:

- In-feed conveyor
- RFID code system for identifying incoming products
- Construction of the shelving according to the EN 1090 standard
- Two stacker cranes
- Out-feed conveyor
- Roof and wall elements
- Sprinkler system
- Pesmel WMS warehouse management system

The pulp distribution center in numbers

- Measurements: 100 meters long, 35 meters high and 30 meters wide
- Handling capacity: 6 to 12 pulp bale units per crane, 1,000 tonnes per hour
- Storing density: 9–10 t/m²
- Total capacity: 25,000 tonnes in an area of 3,000 square meters
- Three main distribution channels for pulp:
 - » 800,000 tonnes are transported as export units by train to Vuosaari harbor to international markets,
 - » 400,000 tonnes are transported by train and trucks directly to customers mainly in Finland
 - » 100,000 tonnes are refined in different units in the mill area.

Pesmel WMS plays a significant role

The distribution center is equipped with the Pesmel WMS warehouse management system, due to which the warehouse inventory is real-time and fully automatic. The WMS plays a big role in the operations of the distribution center as it is connected to both the production automation system and the mill's SAP system. Based on the product and dispatch information obtained from these systems, the WMS controls automated train and truck dispatch and loading operations. With automatic loading, trucks are loaded in five minutes, and a train with 22 cars carrying 1,400 tonnes can be loaded in three hours. In addition to loading efficiency, automation minimizes work safety risks and damage to the equipment and products.

The benefits of the TransBale concept

There are several benefits to utilizing the TransBale concept that make it a strong solution in many respects.

Cost efficiency

The automation of the distribution center lowers operating costs significantly, because there is less need for forklift drivers and supervisors in loading. The functionality can be supervised by the operator at the mill. The high-bay construction enables increased production capacity without the need for additional investments in the distribution center. The high-bay concept requires less space for building, and it is easy to expand the shelving upwards if future needs dictate without substantially disturbing the operation of the facility.

The Pesmel WMS allows adjustable sorting capacity, which means that there is no longer any need for preliminary sorting, as the stacker crane and WMS keep track of the storage location of each pulp bale unit. This enables the optimal use of space, regardless of how many different grades of pulp are produced.

Reliability

The construction is a rack-supported building, which means that instead of being located inside another building, the roof and wall elements are attached to the frame of the shelving. The construction has been designed to function even in winter conditions: it is unheated and fully unmanned, with the exception of maintenance measures.

The simple construction ensures reliable operation with the integral shelving, two cranes and chain conveyors. Thanks to the real-time inventory enabled by Pesmel WMS, the delivery process is also very reliable. The

orders are delivered on time and to the correct place as human errors in stock bookkeeping and dispatch have been eliminated. Also, the availability of the 24/7 HelpDesk ensures that the system operates reliably.

Safety

The fully automated dispatch center functions without forklifts; they are only needed in loading the cargo. The elimination of busy traffic inside the facility is a major safety factor. Also, the pulp bales are handled extremely carefully as the shuttle car moves the bales from the bottom.

Fire safety in the TransBale distribution center is exceptional compared to typical storage facilities. In a typical storage building, the sprinklers are located in the ceiling, so if a pulp bale that is located lower in the shelving starts to smolder, it is difficult to extinguish it. In TransBale, there are thousands of sprinklers integrated into the shelving, which enables effective extinguishing.

Environmental friendliness

The TransBale concept supports environmentally friendly principles. The system works 100% on the energy produced by the Metsä Group mills, so no fossil fuels are used. In addition, the stacker cranes store the energy that is produced when the cranes lowers. This energy is supplied to the mill's own electricity network. Also, because fewer forklifts are needed, less fuel is consumed. TransBale's optimized, efficient use of space minimizes the need for storage space. •



Tony Leikas, president and CEO of Pesmel, and Timo Merikallio, the project director from Metsä Group, sign the agreement on the TransBale distribution center for the bioproduct mill in Äänekoski.

TransBale honed to top shape with Metsä Group

Matti Alanen, Vice President of Logistics Finland at Metsä Group tells us about the cooperation with Pesmel and why they chose us and the TransBale concept.

How easy was it to choose the supplier for the distribution center? Which aspects did you consider when choosing Pesmel?

The selection process was not just a selection between different system suppliers, but also a selection between various technical and functionally quite different storage and handling solutions. The further the preliminary survey progressed, the more the benefits of TransBale became clear.

Factors favoring Pesmel included the company's fine references in forest and other heavy industries, Pesmel being a Finnish company, and experiences of previous solution deliveries to other Metsä Group production plants.

What benefits can you see in Pesmel's solution?

TransBale provides an excellent chance to develop the product delivery pipeline as a whole, not just the dispatch operations at the mill. During the preliminary planning stage, the entire product delivery chain was modelled and the share of cost elements created during the different stages identified. After this, we sought a solution that would enable us to manage these material flows of 1.3 million tonnes in total in the most cost-efficient and reliable manner. TransBale will also provide us with better tools for planning and grouping deliveries in a proactive manner, further benefiting the logistics pipeline outside the mill.

How do you see the fact that the delivery is the first of its kind in the world? For instance, will this bring you more visibility? And does the pioneer position bring any uncertainties with it?

The choice of TransBale for the bioproduct mill is a fine practical demonstration of Metsä Group's pioneer position within the industry. One of our values is renewal, which strongly challenges us to continuously develop our operations. Selecting high-bay storage together with the related material handling and logistical solutions is a fine example of this.

We believe that after completion, the new and innovative solution will attract a lot of interest within the industry, and we are sure to receive requests for a visit.

Before the selection was made, the solution was carefully investigated from the perspective of usability, among other considerations. We studied other solutions of the similar type already in use, with the primary intention of gathering other users' experiences of the operational reliability of high-bay storages. The distribution center to be delivered to the bioproduct mill will be a seamless part of the mill's production machinery, and its reliability must be top class.

What has the development work for the TransBale concept been like with Pesmel?

Detailed planning work was started right away, and Pesmel deserves credit for its fine overall knowledge of the forest industry.

We soon reached an understanding of the most significant technical details. Ideas and alternatives for technical solutions were discussed quite openly at that time.

At the moment, the planning work has already progressed far and is primarily divided into matters related to the construction work and definitions for the WMS (Warehouse Management System). The construction stage at the mill site is just about to begin.

We cannot find anything to complain about in our cooperation. Pesmel's team has been working actively, and we have proceeded with TransBale as planned. •



PHOTO: METSÄ GROUP

Metsä Group's new bioproduct mill

Metsä Group, part of Metsä Group, is building a bioproduct mill in Äänekoski, Finland in the area of their existing pulp mill. It is the largest investment in the history of the forest industry in Finland. The bioproduct mill's annual pulp production will be approximately 1.3 million tonnes, of which 800,000 tonnes will be softwood pulp and 500,000 tonnes hardwood pulp.

The softwood pulp will be exported mainly to Europe and Asia. In addition to premium pulp, the mill will produce much more electricity than it will need, as well as tall oil and turpentine, among other bioproducts. All side streams from the bioproduct mill are planned to be utilised in the ecosystem that will be formed by various companies around the mill.



PHOTO: KAJ FAHLUND

Customer Case:

Smart roll flow at APRIL Fine Paper mill in Xinhui, China

APRIL Fine Paper (Guangdong) Co. Ltd, which is part of Asia Pacific Resources International Holdings Ltd (APRIL), started up a new fine paper machine at its Xinhui plant in July 2012. The annual production capacity of the new 8.65 m wide production line will be 450,000 tonnes per year. At the same time, a new converting plant with shipping facilities for both rolls and pallets was constructed.

A fully automated Intermediate Roll Storage (IRS) system is fitted between the paper production and converting, the purpose of which is to offer an unmanned, flexible sorting buffer between the main production processes. The selected solution was Pesmel's TransRoll® rack storage system.

The challenge and alternative solutions

From the start, it was clear that effective, centralized Intermediate Roll Storage (IRS) was needed to ensure free and well-controlled material flow between Xinhui's state-of-the-art paper production line, converting plant and direct hot load shipping. Without an effective IRS solution, the production line could easily become bottlenecked.

A clamp truck-operated IRS was eliminated at an early stage of the feasibility study because with all the machinery and floor space it requires, this was not the optimal solution. Fire safety was the limiting factor for an overhead crane storage concept. Of traditional IRS solutions, the high-rise AS/RS (Automated Storage and Retrieval System) rack storage solution would be the most competitive solution for paper mills' roll handling needs.

Pesmel's unique TransRoll® technology is a fourth-generation solution for the buffering and storing needs of paper mills and converting plants. Its deep channel technology has been developed especially for the needs of the paper industry based on traditional AS/RS systems.

The selected Pesmel TransRoll® system

In the APRIL Xinhui mill, one of the biggest advantages of the selected rack concept was the simplified mill layout that it offered. Straight conveyor lines lead directly from the winder decks to the IRS intake sorting as well as to sheeters and roll shipping. The rolls are handled in a horizontal position all the way from the entry pick-up to delivery with the TransRoll sorter vehicle's cradle, and in storage the rolls lie on their sides on V-shaped storage channel beams.

With this rack storage system, fire safety is superior to alternative concepts. The water sprinkler system is built into the rack, which enables uniquely precise fire extinguishing with standard sprinkler nozzles. This can't be done in storage systems where sprinkler nozzles have to be installed high on the ceiling structures 15 meters or more above the floor.

Expectations met

The TransRoll® concept was selected after a thorough evaluation process to best suit the Xinhui mill's needs. It offers the simplest mill layout with clearly less equipment than alternative solutions require. It can handle rolls without limitations on roll dimensions or packing variants. The rolls can be unwrapped, partially wrapped or fully wrapped because the rolls are handled in horizontal position all the time.

At the APRIL Xinhui mill, the TransRoll® system has made controlling production easy, which results in higher productivity due to better overall process efficiency. •

Pesmel Materi

– tailored solutions for paper



Material flow-related conveying, packing and storing operations are internal logistics that are vital for smoothly flowing mill processes. These processes demand a different set of skills; know-how of material flow – Material Flow How. Jouni Räisänen and Kaj Fahllund put their heads together to find the best solution to the customer.

Material Flow How

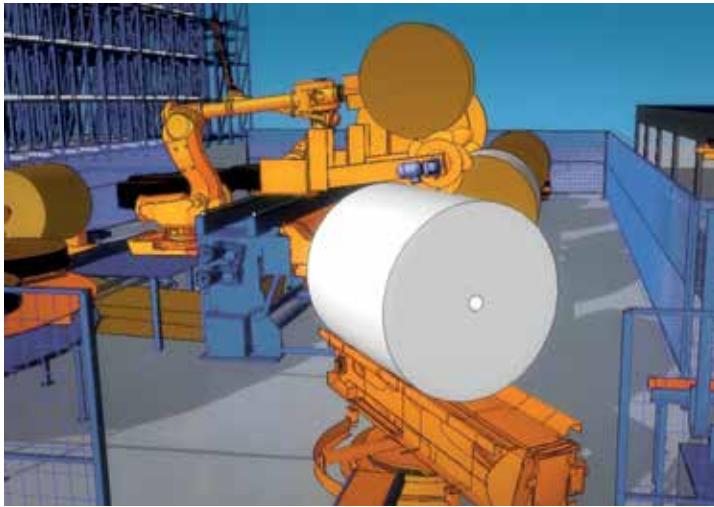
mills and converting plants

Pesmel relies on its extensive experience and know-how when providing material handling systems for paper mills and converting plants.

In any paper mill, the processes can be divided into three main areas – fiber preparation, paper making machinery and finishing material flow – a tricycle that works best when correctly balanced. In this instance, material flow means everything from the slitter winder deck to the mill's shipping dock. Of these three main areas, pulping and paper making are process technologies to which the paper makers are educated for, whereas the finishing material flow is left with less attention. However, material flow-related conveying, packing and storing operations are internal logistics that are vital for smoothly flowing mill processes. These processes demand a different set of skills; know-how of material flow – Material Flow How.

The key to cost-effective internal logistics is a well-engineered system layout that saves space and minimizes the amount of equipment utilized. In order to create this, a vision of an optimal system is required as a basis for the material flow layout engineering. A common layout engineering mistake is to place too much focus on details at an early stage by jumping directly to component application. This hinders your ability to see the big picture – what is really needed, and why.

It's safe to say that no two mills are identical, so therefore logistics system layouts are always separately tailored for each mill using base modules. This requires in-depth understanding of processes and engineering, as well as a flexible attitude when searching for the optimal solution. At Pesmel, we are specialized in the creation of layout concepts for paper mill internal logistics, specifically for how material moves inside the mill. Pesmel has developed the concept of Material Flow How that comprises solutions for roll handling, packing, storing and dispatching – all combined with tailored engineering. >>



System engineering of a functional mill concept

The production of goods take naturally the center stage at paper mills, but attention must be paid to internal logistics in order to avoid bottlenecks in the production process. The system engineering of a paper mill begins by defining the must-dos for the internal logistics: specific grade-related handling requirements, the needed buffering capacity between production and shipping, packing method selection based on the mill's actual needs as well as the preferred automation level.

Pesmel's cutting-edge solutions

When Pesmel's specialists make their first visit to the customer's site, the customer may not necessarily be able to put into words what they want or even know exactly what they need. In these situations, the service provider's sensitivity to interpret the customer's needs is emphasized. Pesmel's specialists have the ability to listen to the customer and, thanks to their expertise in the field, truly understand what they mean. When the connection between the customer and the service provider is uncomplicated, it is possible to start looking for the optimal layout concept.

In fact, it is common that there is not only one possible layout solution, but several. Our consultants visit the mill to assess the current situation. They have the ability to see beyond the current state and envision what is possible to realize in that environment. Pesmel's advantage is that we are able to deliver tailored solutions that include all aspects of the mill's material flow process. We are able to see the big picture and to provide the most suitable alternatives across the entire finishing process. Conversations with customers with a genuine understanding are a prerequisite for finding and selecting the

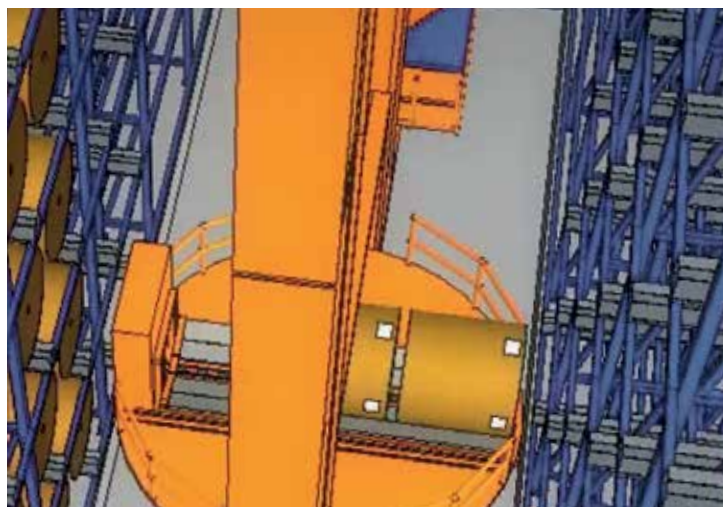
most suitable solution for each case. The key is to start this communication early enough, before making other decisions that will limit the number of layout options.

At Pesmel, we differentiate ourselves from our competitors in the concept engineering phase with our 3D illustrations and animations, enabling us to verify and demonstrate solutions in a very tangible manner. Three-dimensional layout concepts are much easier to understand when compared to a stack of 2D illustrations, even for engineers who have spent most of their careers with two-dimensional illustrations. Our 3D illustrations are the first steps on the path which can end up to full-scale simulations with actual production data.

A simulation study is a vital tool for assessing the practical situation and planning the layout concept at an early stage of the project. The real situation is simulated with real product measures, capacities and equipment layouts in order to identify the possible bottlenecks and to analyze the total capacity of the mill. With this information the customer is able to optimize the purchase, often with big savings in the actual machine purchase. A simulation study also gives guidelines to what kind of roll-handling, packing, storing and dispatching systems should be build. The study also creates a foundation for an upper-level control system and helps to plan and execute it in practice with a production-oriented approach.

Strong and experienced resources

Because Pesmel's experts are all in-house, the system engineering process is more flexible and easily controlled. All the phases of the delivery – system engineering, manufacturing and assembly of the machinery, installation of the system – are overseen by Pesmel's own skillful personnel.



When the whole system is delivered by one supplier, all parts “talk” with each other and the production flow can be guaranteed.

Pesmel FlowCare helps in optimizing the mills' operations

IoT, the Internet of Things, means the connection between various equipment, vehicles and buildings that is created with sensors, software and network connectivity. This makes it possible to collect and exchange data between the various objects and to remotely monitor and control them. The collected data can be refined into usable form through analysis, and it is possible to create different kinds of reports and other resources which help to improve the mills' production and cost-efficiency.

A paper mill is full of sensors that are controlled by programmable logic controllers (PLCs). With the help of IoT, it is easier to collect and analyze data than ever before. For example, the mill's service manager can use IoT software to identify and anticipate the equipment's and system's need for spare parts and maintenance, as well as planning maintenance schedules. With the help of the software, maintenance personnel no longer needs to constantly make inspections on the equipment, which makes the work of the maintenance personnel easier and creates cost savings. In addition, operating expenses are lowered when fewer personnel are needed to ensure the reliability of the mill.

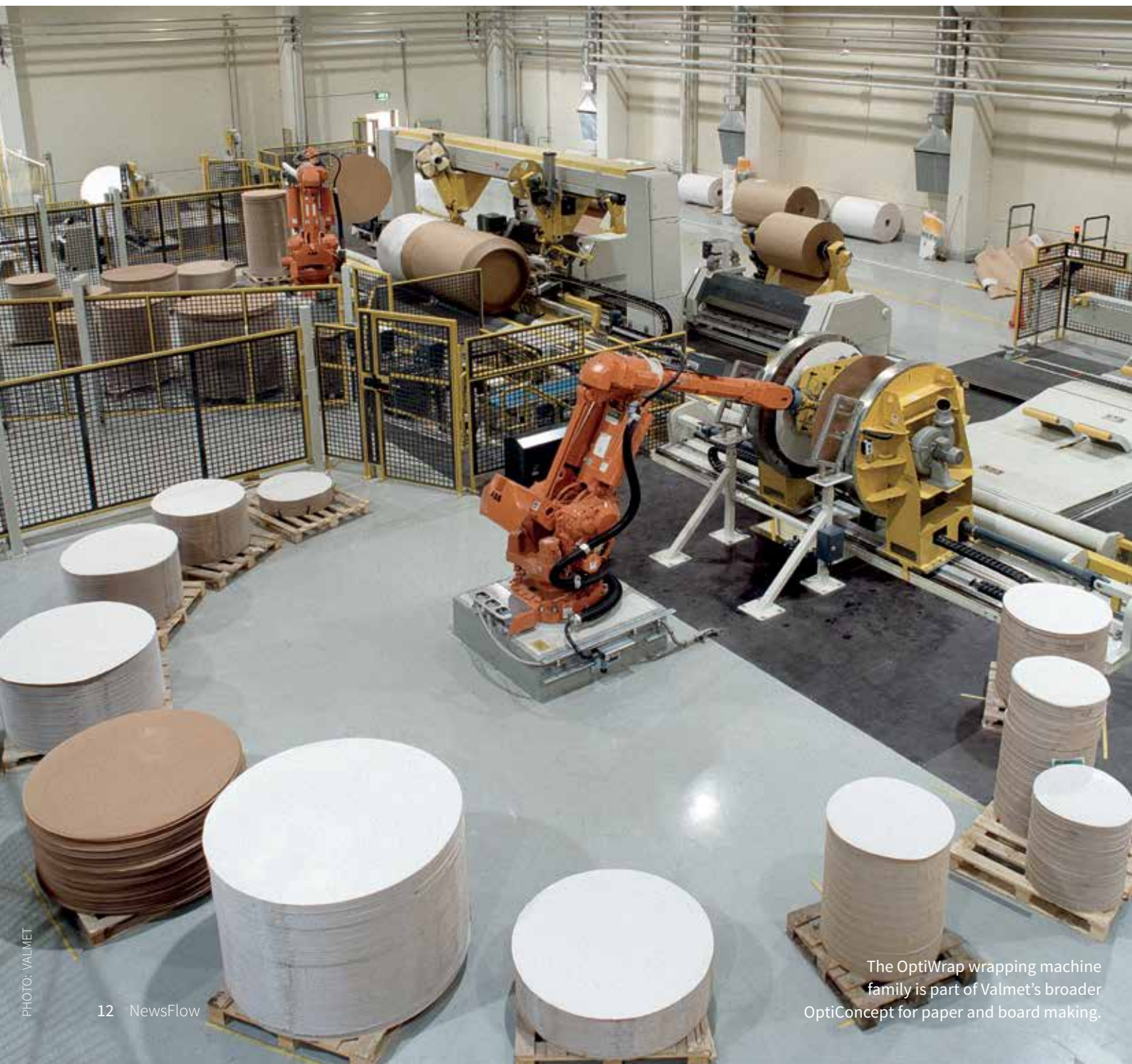
Pesmel delivers the FlowCare IoT software as part of the system delivery. FlowCare is a part of Material Flow How together with machinery and other equipment, automation and data systems. FlowCare primarily works in the mill's internal network and is fully operated by the customer. The software can be downloaded to a smart phone, tablet or PC,

and the customer can use it to follow the operation of any single machine in the mill and the technical operation of the mill, find bottlenecks in production, spot the maintenance needs of the equipment in advance and optimize the timeliness of maintenance work. The software is intended for the customer's own use. With FlowCare, the customer can collect and analyze equipment data for operative and maintenance purposes. Pesmel does not collect or use the data collected from the processes and production, instead the customer analyzes the data and makes their own decisions based on that. This is part of Pesmel's customer-oriented service. •

Pesmel's Material Flow How

- The ability to understand customer needs
- The ability to find alternative options for the mill layout
- Concept simulations
- Flexible solutions and services
- The solutions cover the whole material flow, from slitter winder deck to the shipping dock
- FlowCare software (IoT) included in the delivery to optimize the operation of the mill

New synergies through collaboration



Pesmel and Valmet combined their expertise and know-how in roll-handling technology to provide better service to their customers. Both companies have found new competitive advantage and boosted their sales through the cooperation agreement that was signed in 2014.

Twenty years ago, it was the time of the “South-East Asian boom,” and a lot of Pesmel’s stretch packing machines were sold as part of Valmet’s roll-handling systems. This is when the cooperation first started. Valmet has also used Pesmel as a subcontractor of manufacturing and assembly, such as kraft wrapping machines, reelers and coating heads at Pesmel’s workshop in Estonia.

Cooperation contract

Pesmel and Valmet signed the cooperation agreement in 2014. As a result, Pesmel is now Valmet’s exclusive contract supplier in roll handling, packing, and storing technology. Pesmel maintains and develops the products, whereas Valmet has the rights to the products.

Marko Korpinen, Product Manager at Valmet, explains the background of the agreement:

“Valmet was looking for more competitiveness and agility through a more versatile offering and wider competence. Pesmel is small and agile, as are our competitors, and the cooperation provides us a competitive advantage. Pesmel specializes in roll handling and internal logistics, which filled the hole in Valmet’s portfolio perfectly.”

Pesmel’s portfolio included stretch

packing solutions, whereas Valmet has specialized in kraft packing. This way, Valmet’s offering completes that of Pesmel.

About Pesmel’s future ambitions says **Risto Lehtonen**, Sales Manager:

“Our future goal is to be able to sell Pesmel’s storage solutions as part of Valmet’s larger packages.”

Division of duties

Valmet has the contractual liability and takes care of the customer interface. Pesmel’s designers are in charge of the planning and execution of the projects. As Valmet is in charge of the customer interface, the calls for offers are forwarded to Pesmel. The sales managers of the companies work closely together on a daily basis.

When supplying a completely new production line or a line rebuild, where roll handling is one section, the contracting party is Valmet. Pesmel is the contracting party in smaller projects, such as a single wrapping machine or extensions and rebuilds of the conveyor system.

Field maintenance is organized by Valmet, including tasks such as machinery audits and comprehensive maintenance. Specialists at Pesmel Service support these functions among other subcontractors.

Successful projects sprout from successful collaboration

Due to the cooperation, Pesmel receives projects that are both technically and commercially more diverse than before. Here are a few examples of projects Pesmel has landed through the cooperation with Valmet:

Cartulinas CMPC S.A., Maule, Chile, 2015

The project included a rebuild of a roll wrapping and handling system and automation of the wrapping machine with robots, including several extensions to the existing conveyor system. The semi-automated wrapping machine was converted to fully automated. The project was the result of the good relations between the people at Cartulinas and Valmet, and the cooperation with Pesmel is a natural continuation of that.

Parenco BV Renkum, Netherlands (Valmet Technologies Inc.), 2015

The project was related to a change from fine paper production to cardboard on a production line that had been shut down for two years. Valmet provided a new winder with a new roll handling system for the rebuild of Parenco’s PM2. The project was introduced through Valmet.

Metsä Board, Husum, Sweden (Valmet Technologies Inc.), 2014

Pesmel provided a handling and packing line rebuild for folding boxboard with a bigger roll size. The production line was changed from fine coated paper to coated boxboard. A new handling and packing line for folding boxboard was built to function alongside the existing one. This delivery was a part of larger line rebuild made by Valmet. >>

A combined product portfolio

Pesmel's and Valmet's product portfolios have been combined and sorted so that the people in sales and product management are well aware of the complete offering and its benefits. Valmet's product portfolio, model equipment and know-how are fully at Pesmel's use, and vice versa.

People at both Valmet and Pesmel share their ideas for maintenance and development. The portfolio needs to comply with modern safety standards and components. The two companies work together to harmonize the equipment; all equipment needs to be at the same level so that it fits together. New development ideas are hatched in order to stay ahead in business. Also, customers set new requirements for the equipment, and naturally Pesmel and Valmet aspire to meet those requirements.

"Valmet benefits from Pesmel's know-how in storage and the metal industry. They provide us new ideas that can be applied to our roll-handling solutions," says Marko Korpinen.

Transfer of know-how

Valmet's long history in the industry, the product portfolio, offers and deliveries are all in Pesmel's use for sales support purposes. The key people in Valmet's roll handling have been transferred to Pesmel.

Risto Lehtonen worked at Valmet for 20 years before his transition to Pesmel.

"I started as a mechanical designer and sales layout designer in roll handling. Through the transfer, my work tasks have become more diverse, which is interesting. Logistics is my "thing," and at Pesmel I have gained more knowledge of storage and Material Flow How. Having said that, there are many things that haven't changed: it's still the same industry, the same familiar faces. The colleagues are still the same, as are the customers. The know-how that the two companies now offer together has only changed for the better: thanks to the fluent cooperation, our knowledge is ever increasing," says Risto.

Benefits of the cooperation

Through the collaboration, Valmet has got what they were looking for: the opportunity to serve their customers better. The customers now get Valmet's quality and brand at a competitive price, delivered in an agile manner. The customers get specialist service from experts in the field of roll handling.

As for Pesmel, we have gained more clientele and more diverse projects. Sometimes Valmet is the contracting party selling Pesmel's products, sometimes Pesmel sells Valmet's products, and then there are rebuild projects that modernize existing equipment provided by either.

"The transition has been carried out fluently; there has been no downswing in sales even though it was a significant matter of principle to transfer design functions to another company. What has facilitated this is the transfer of key Valmet people to Pesmel: it has ensured flowing communication between the two companies as well as the customers," says Marko Korpinen.

The design process is now more straightforward because there are no overlaps. The project management and delivery process have been unified. Valmet's high-quality products and high visibility in the market combined with Pesmel's expertise in roll handling and agile execution ensure that customers are served better and more quickly than ever.

"Before the cooperation agreement, Valmet has used several subcontractors, so now the design functions are more in our own hands. Our documentation has been unified, so there is no extra work there. In general, the cooperation has resulted in leaner processes," says Marko Korpinen.

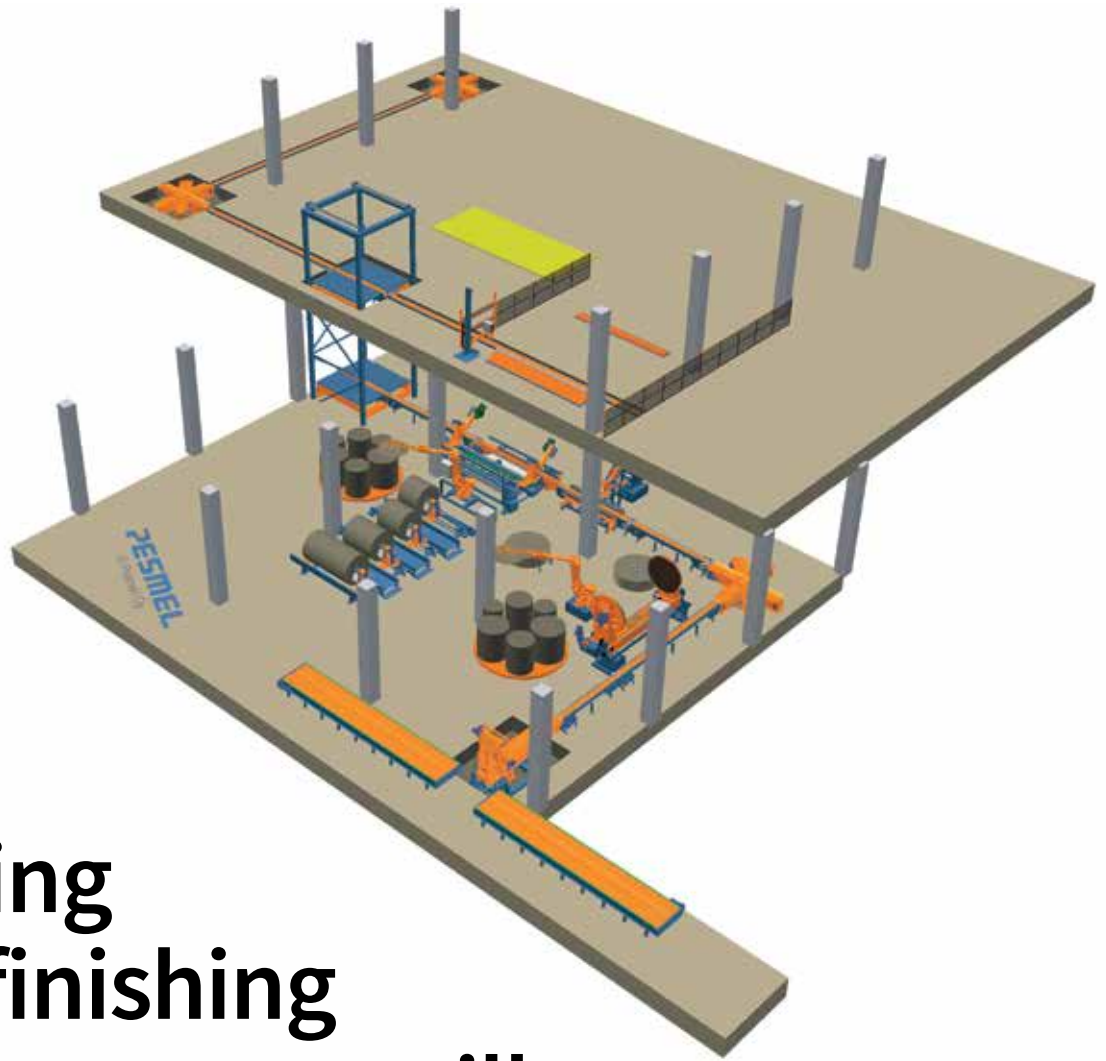
As a company should always develop itself, Pesmel and Valmet have also defined development areas for their cooperation. Marketing functions work closely together, cooperation during project execution is being improved, and repeatable concepts are being developed.

Says Marko Korpinen:

"From Valmet's point of view, the whole cooperation has taken off better than expected. The cooperation is fluent and the customers trust our products, which result in good sales." •



Marko Korpinen and Risto Lehtonen work closely together on a daily basis.



Rebuilding the roll finishing of existing paper mills

– what does it mean?

Pesmel provides rebuilding services to modernize paper mills' roll finishing operations to meet today's requirements.

By rebuilding existing machinery its lifetime can be extended or its handling capacity restored to its original level.

Usually, the need arises when outdated equipment causes a bottleneck in the production line. We at Pesmel provide rebuilding services for roll conveyors and roll packing lines. Typically, a rebuild project can be, for example, robotization of existing machinery, including a safety upgrade for the whole line. As a result, machine efficiency improves significantly and additionally, due to less manual operations, the risk of accidents at work is reduced. Replacing worn-out parts with improved technology features will give old machinery better runnability.

Different ways to modernize finishing area equipment at a paper mill

We provide modernization services for our own machinery, as well as roll handling machinery from Valmet and other suppliers. There are several ways to modernize the equipment at a paper mill. Our experts can evaluate which option is the most cost-efficient for the customer: rebuilding the existing equipment or replacing it totally with new machinery. Modernization is often needed when a mill's production, e.g. paper grade, capacity, or roll dimensions are changing and the existing machinery needs to be upgraded to meet new production demands. A good >>

example is the ongoing trend of paper mills changing their paper grade from white grades to board. Usually this means changes in roll size and packing method. All in all, whatever the need is, it can be solved by either rebuilding or replacing the existing system with new machinery.

We offer modernization solutions for many needs:

- Changes in production capacity
 - » Rolls are wider or narrower than before
 - » The amount of rolls to be handled has changed and the material flow needs to be improved to avoid bottlenecks
 - » The quality of package needs to be improved to avoid, moisture damage for example
- » The production capacity needs to be improved by minimizing disruptions and improving runnability.
- Improvements in automation level and reducing manual operations, e.g. by adding robots
- PLC update (when there are no spares available to old PLC), including the user interface update (PC or Touch Panel). For example, new diagnostics can be added to speed up problem-solving in the old machinery.
- Changes in roll transportation needs within the mill, e.g. conveyor system changes in connection with a new winder.
- Upgrading existing machinery to meet today's safety requirements and standards.

The required know-how of the supplier

In order to be able to provide the optimal rebuild solution, the supplier needs to know the customer's processes inside out, as well as the existing system in the mill. They need to know and understand how the machinery meets production requirements.

Thanks to their long history and in-depth expertise in the paper industry, our specialists at Pesmel have the capability to see the big picture at a mill and make the most suitable suggestions and plans. Usually, the customers know what the outcome needs to be, and when Pesmel's specialists are used to evaluate the requirements, the best solution will be defined in co-operation with the customer. •



A rebuild case

Pesmel carried out a rebuild project for a paper mill in 2016. The old kraft wrapping machine dated from 1986 and was partly manually operated. Pesmel's specialists evaluated the amount of modification needs to meet the new production, and together with the customer ended up with a solution where a completely new wrapping line was built. When compared to a major rebuild of the existing wrapline, this was a more efficient solution with regard to the mill's internal logistics and total costs. The rebuild improved production efficiency in all aspects releasing one operator to take up other duties.

In spotlight:

International Paper

We interviewed Stan Merrill, Senior Staff Engineer for Finishing and Converting part of the Technology Group at International Paper (IP). He gave us his view on the expectations set on suppliers in the paper industry and the current trends in roll handling.

Stan Merrill has extensive experience in the paper industry. He started as an apprentice at a paper mill while he was working on his engineering degree, worked as a field engineer and in management positions at Lamb-Grays Harbor Co. from the late '70s, and many challenging projects later landed at International Paper in the late '90s. Now he's part of a team of engineers and acting as a subject-matter expert in finishing and converting area. He has worked in close cooperation with Pespel's specialists on various projects.

Expectations of Tier 1 suppliers

Tier 1 suppliers are an exclusive group of suppliers that IP primarily works with. IP constantly ranks them in order to find the best ones to work with, so it is a tough category to get into. Stan Merrill talks about their requirements for the suppliers:

"In selecting a supplier, there are a hundred things to look at. One of the most important things is the supplier's technical knowledge. Are they able to create what we need, do they have the understanding we need, for example in automation and safety? The supplier's references tell us a lot about their know-how. For example, if I need an axial stretch wrapping system and all they've done are radial systems, they're probably not the right choice. I tend to work on an 80/20 rule in projects, meaning that I'm willing to take a risk on development, you know, to move forward with progress, for about 20% of a project, provided that it's well managed."

"The composition of the engineering team says a lot about the company's know-how. We look at the mix of talent in a company. Seniors know the history of the industry. Experts who started about ten years ago are the ones who know how the current systems work. Then there are the new talents >>



who challenge concepts and bring in new technology such as 3D modeling and stress analysis. This tells us that the company has a history and experience but also knowledge of today's technology and the migration between these."

"The company should be large and flexible enough to be able to handle two to three projects at the same time in a reasonable timeline. And honorable, in the sense that they take responsibility over their work and provide system support."

Are there things that the supplier should be careful of, then?

"A vendor should not just push their own ideas and dismiss the customer's wishes without proper reasoning," says Merrill.

"The customer may have done extensive research and testing and have good justifications for why they want certain solutions. The vendor should be open to the customer's research and knowledge. It is a partnership where we're trying to take the vendor's knowledge of how to build machines and how to apply the latest technology to the performance of the machine and trying to marry it up with our knowledge of construction operation practices and end-user package requirements."

"Stretch means less equipment, less energy consumption, and a lot more safety."

– Stan Merrill

Current trends in roll handling

Stan Merrill talks about how the paper business has changed in recent decades:

"At IP, the requirements of the packaging equipment have changed drastically over the past 30 years. There used to be a couple of major suppliers who, based on their offering, dictated what customers could have and when, and what kind of buildings they should build."

"In the past, installing and starting up a large facility could take almost a year. In today's world, nobody wants to put twice the cost of the equipment to the construction costs. Everything needs to be tested before moving to the facility; and the costs of the systems have dropped significantly thanks to careful planning and design. Today, nobody's building new buildings; the new equipment is fitted into existing premises."

There has also been a significant change in roll-handling equipment:

"Not much of the equipment that was introduced ten years ago is used anymore. The old equipment is big, they have lots of individual machine controls, marginal safety circuits, huge energy usage, and they are costly to maintain. Today's systems are a lot smaller and faster, they have complicated controls because of the safety systems, and they have minimal energy consumption and maintenance costs compared to the old systems. The system reliability has also improved a lot, which was never a component before," says Merrill.

Stretch-film wrapping is taking over kraft packing

Stretch-film wrapping is becoming increasingly popular as a packing method in the paper industry. What do you think are the reasons for this trend?

"Previously, stretch-wrapping systems were driven by small companies that did not have the resources to do research on the polymers and the creation of packages. Over the years, they have been able to gain more knowledge and are now able to design better solutions. I think people are starting to understand that stretch means less equipment, less energy consumption, and a lot more safety because



Stan Merrill and Kaj Fahlund at Pesmel's workshop in Saue, Estonia attending the trial run of the stretch film packing line designed for International Paper.

there's not all that complex machinery. The main reason that hinders the migration from kraft to stretch is the fact that changing the packing method for one mill in company would require changing it for all the mills that make the same product, which requires a lot of effort," explains Merrill.

Cooperation with Pesmel has been a pleasant surprise

The paths of IP and Pesmel crossed for the first time ten years ago:

"With the first project ten years ago everything ran fine, everybody was happy. But there were a couple of failures in communication and execution, and we beat them up pretty badly for that. But as Pesmel assured us that they had learned from our feedback and corrected their practices, and because their technical solution, plan and offering were superior, it was well worth the risk to move on to the next project. This project proved to be a pleasant surprise: they were a lot more open about their processes and designs, they had interesting new concepts, and they were sharing ideas and refining their designs with us. Moving on to the

new projects, Pesmel has always learned from the previous one and automatically moved this knowledge to the next one," commends Merrill.

"We evaluate our vendors continuously. Pesmel has better performance year by year." •

INTERNATIONAL  PAPER

International Paper Company is an American pulp and paper company – the largest such company in the world. It is a leading manufacturer of containerboard and corrugated packaging. It has approximately 65,000 employees, and it is headquartered in Memphis, Tennessee.

Automation increases production efficiency and safety

Marko Nousiainen, Director of Engineering and R&D, talks about future developments in automation and how Pesmel's solutions respond to the needs they create.

Finnish Metal and Engineering Vision 2025, published by the Research Institute of the Finnish Economy, presents future trends in the engineering industry. Marko Nousiainen gives his view on how Pesmel's products are keeping up with these trends.

The utilization of information technology is ever increasing

"Since the 1980s, ICT has come into the picture along with automation systems: production control, production planning software, and the Internet of Things have become commonly used. Ten years ago, we had only one ICT designer at Pesmel. Now we have ten. The growth has been rapid, and there is no end to it," says Marko Nousiainen.

"The amount of data systems around hardware is increasing, which makes it easier to control and monitor the data that the system produces. You get so much more out of the machinery with the help of IT: operations are more controlled and systematic, production is more efficient, and the utilization rate and reliability can be improved," continues Nousiainen.

The use of robotics is becoming more common

Industrial robots are becoming increasingly common in mill and storage solutions in order to minimize the amount of physical labor. Heavy, non-ergonomic labor is being transferred to robots. This is also utilized in Pesmel's solutions.

"A robot does not tire or go on strike. This is a way to



Marko Nousiainen is convinced of the benefits and bright future of information technology in engineering.

PHOTO: SANNA RINTATALO

replace manual labor. A future vision is that it is possible for people and robots to work safely together in the same space. First, a proper artificial intelligence – one that resembles human intelligence – is no longer a utopia. However, a lot of research is yet needed to achieve this," says Nousiainen.



PHOTO: PESMEL

The Industrial Revolution is still progressing

"The Industrial Revolution started in the 18th century along with the mechanization of production, which was made possible by the invention of water power and steam power," explains Marko Nousiainen.

"Currently we are in the fourth stage of the revolution. This includes smart factories with production control systems that make production more adaptable. This means that production can be adjusted according to demand. This is facilitated by the possibility to forecast the consumption of goods and optimize production based on that. This also enables reduced consumption of energy and helps to minimize the carbon footprint," continues Nousiainen.

The Internet of Things is creating new opportunities

Today, many companies, with Pesimal at the forefront, provide data collection software that collects information about the machinery's operation.

"Pesimal FlowCare collects online and history data about machinery. The data is available to both the customer and Pesimal's maintenance organization to analyze the performance and maintenance needs of the mill. With the help of FlowCare, we can serve our customers significantly better than before," says Nousiainen.

New energy solutions on the rise

The high market price of electricity is spurring companies on to find ways to save energy. Rotary engines today are very energy-efficient, and alternative solutions for energy production are being taken into use.

"Only our imagination limits what we can do with IT."
– Marko Nousiainen

"Pesimal provides solar panel solutions for facilities that do not produce their own energy, such as high-bay storage facilities. Their roofs are an ideal location for the panels. The energy is collected when the sun is shining, and the stacker cranes utilize this energy in lifting goods during daytime. At night, there is no solar energy available, so stacker cranes bring goods down from the shelves, acting as generators and collecting energy from the braking force. This energy is also pushed to the mill's electricity network. In practice, this is free electricity within the mill," explains Nousiainen.

Machines become ever smarter

"The Internet of Things has brought new thinking. Previously, mills have been very local, but thanks to remote access, the operating field is now open. ICT is also bringing more science into understanding why something works or not. Information used to be inside people's heads; now things are more transparent. Now the information is more easily available and unbiased, for all organization levels, from bottom to top," says Marko Nousiainen.

Nousiainen is convinced of the benefits and bright future of information technology in engineering:

"Only our imagination limits what we can do with IT." •

Pesmel MES boosts mill production planning and execution

The Pesmel MES manufacturing execution system is part of the Pesmel Control product family, which is used to automate and manage information flows at mills.

Pesmel Control is an integrated product suite that is part of the Pesmel Material Flow concept. Solutions for managing a mill's information flows are available at three different levels:

Level 1: Pesmel automation. This includes low-level software that controls the machinery.

Level 2: Pesmel WMS (warehouse management system) and Pesmel Flow-Care. This includes software that enables production operators to monitor the production line and maintenance personnel to see equipment status in real time.

Level 3: Pesmel MES, which includes production planning and execution functions. It shows the current status of the processes in real time, and also an overview of the whole production process over a longer time frame.

Modular functionalities of Pesmel MES

Pesmel MES is used by production planners, warehouse managers and controllers to manage the different phases of the production process:

Production planning and execution is the area where MES shows its true benefit. By using MES, you can make the mill's operations more efficient by freeing staff from manual operations to more productive duties. Pesmel MES includes the following features:

- Detailed production scheduling: Plan timetables, assign resources. Includes simulations to see which plan works the best.
- Production dispatch: Automatically sends the detailed production plan to the right machines and people. Includes electronic work instructions.
- Production execution management: For supervising production execution.
- Production data collection: Includes feedback from the different work phases. This information is used for further processing and reporting.
- Production tracking: This feature is used to trace, for example, detailed production and quality information data back to products or vice versa.
- Production performance analysis: Reporting, including information such as production yield numbers and the utilization rate of equipment.

Warehouse management keeps track of the storage and enables the optimization of storage levels in parallel to production planning so that the amount of

stock is always optimal. It controls the way the rolls move and governs information flows in the storage system.

Maintenance management keeps track of the service needs of the machinery and equipment. It promotes preventive and predictive maintenance and minimizes the risk of bottlenecks.

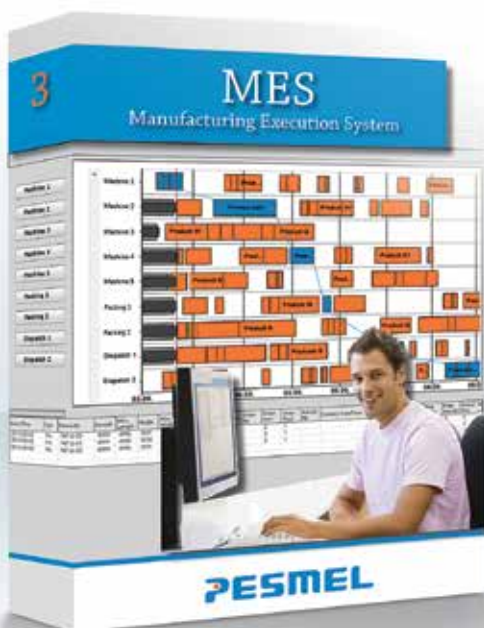
Quality management includes automated data collection and reporting based on the mill's quality plan.

The benefits of Pesmel MES

Pesmel MES is a 24/7 electronic supervisor that improves production efficiency and safety. By utilizing Pesmel MES for production planning and execution, you can get immediate benefits:

- The amount of manual labor decreases, making operations and production more cost-efficient.
 - » Time savings: complex manual calculations could take 2–3 days, but automatic calculations are processed in only a couple of seconds, without human error.
 - » There's no longer a need to keep buffer storage as the stock is always in its optimal state.
 - » The amount of surplus material and waste is minimized.

Other benefits that are gained over a longer timeframe are in the agility and speed of production, which create a competitive advantage by reducing product production cycle times and time-to-market. In addition, Pesmel MES provides the opportunity to improve the production process through continuous learning. •





Sauli Ketola, Tuomas Vuorenmaa, Antti Kuusisto and Markku Rissanen are ready to serve Pesmel's customers

The FlowCare team takes care of Pesmel's customers

Along with Pesmel's system delivery, you get the expertise of the whole FlowCare team to support the operations of your mill.

With the help of FlowCare, our personnel are able to get closer to our customers and to serve them better. The team is able to collect and analyze data from the machinery to improve its operation and to monitor its condition. The application responds to our customers' need to monitor, improve and forecast maintenance.

What is exceptional about FlowCare is that it is always supplied as part of the system delivery, not as separate software. Our specialists are thoroughly familiar with our customers' needs and equipment, which are the starting point for the development of the software. The solutions offered by software houses are data-system-oriented, unable to provide similar level of expertise.

The development team consists of experts in their own fields

The development team consists of specialists from different fields: there are ICT designers, a system designer, an equipment designer, and a maintenance specialist. They combine their knowledge to provide an all-inclusive service that helps our customers to better understand their own equipment.

The system designer contributes their knowledge of the delivery as a whole and the Material Flow How. This includes information used in measuring the performance of the system, such as turnaround time, availability, and utilization.

The equipment designer brings their

profound knowledge of individual machines, maintenance targets, and their lifetimes and maintenance intervals.

The maintenance specialist knows how the equipment is serviced in practice, bringing knowledge of what kind of information should be available to the maintenance personnel at the mill and instructions for them.

The ICT designer knows the ICT technology, collects the requirements from the other specialists and brings them into the software, and creates the analytics. The work of an ICT designer is to make compromises between the requirements set by the equipment and the customer, fitting different pieces of the puzzle together. The ICT designer is also an expert on usability and makes the software user-friendly and safe.

The future of FlowCare

The FlowCare team is dedicated to constantly developing the software. In the future, the level of customer service is being improved with an online store, which is going to be piloted this year. With the help of FlowCare and the customer-specific online store, customers can always stay up to speed on their maintenance needs, able to see the range of spare parts and their time of delivery and easily buy them. An online salesperson is available during office hours for personal service. Next year a ServiceDesk interface will also

be piloted, which will make it easier to contact our service personnel. Thanks to FlowCare, Pesmel will be at the forefront when it comes to availability. •



FlowCare

- Data collection system
 - » Available now
 - » Finds bottlenecks in production
 - » Follows the operation of individual machines
 - » Follows the technical availability of the machinery
 - » Detects preventive maintenance needs for machinery
 - » Helps to plan on-time maintenance
- Online store for spare parts
 - » Piloted in 2016
 - » Always up to date
 - » Saves time in purchasing spare parts
 - » Online salesperson assists you during office hours
- ServiceDesk interface
 - » Helps you to communicate with Pesmel's service personnel
 - » Piloted in 2017

HelpDesk assists Pesmel's customers in sticky situations



Marko Heikkinen,
General Manager, Service

PHOTO: SANNA RINTATALO

A 24/7 HelpDesk is available to Pesmel's customers to guarantee undisturbed performance of the system.

Pesmel's HelpDesk offers technical support for our contract customers 24/7. Our trained duty officers are experts in the field of automation and thoroughly familiar with our systems. In questions related to mechanics or pneumatics, for example, they have the support of our entire organization. We have a guaranteed response time of one hour, and when needed, a remote connection will be created within two hours.

The HelpDesk has its own phone number and e-mail address; there is no telephone switchboard or other intermediary contacts. With the help of the HelpDesk service, our customers can secure continuous production and release their resources to other duties.

A fixed monthly fee helps in budgeting costs, and contract customers also get affordable prices in possible extra maintenance work.

Customer satisfaction guaranteed

Marko Heikkinen, Pesmel Service's General Manager gives a good example of the effectiveness of the HelpDesk.

"One evening, a customer of ours had a problem with their equipment. They did not have a service contract, and attempted to fix the problem themselves several times. Six hours later, in the small hours, a bigger problem emerged when a part of the machinery broke. The customer tried to replace the part and run parameters, unsuccessfully."

The following day the customer decided to call their contact person at Pesmel. The call was directed to the HelpDesk, and 30 minutes later production was running normally again.

"The customer was so happy with the swift service that they wanted to make a service contract with us right away," says Heikkinen.

"They realized that Pesmel's service is an excellent way to prevent drawn out stoppages and the loss of income caused by them," Heikkinen concludes. •

HelpDesk in a nutshell

- Provides technical support and guidance to systems provided by Pesmel
- Available 24/7
- Service in English and Finnish
- Trained duty officers are thoroughly familiar with the systems and have the support of our entire organization
- Fixed monthly fee and service-charged phone calls
- Guaranteed response time for phone calls and e-mails: 1 hour
- Guaranteed response time for remote connection: 2 hours
- Own phone number and e-mail address

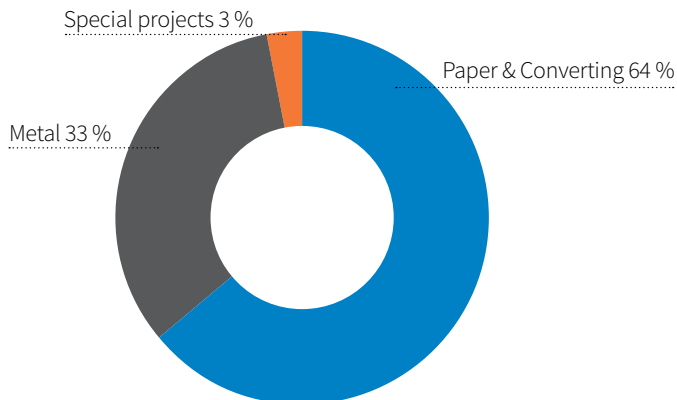
In fall 2016, Pesmel will launch a new online store. First it will be piloted with a selected audience, after which it will be available for all Pesmel clientele.

Pesmel in a nutshell

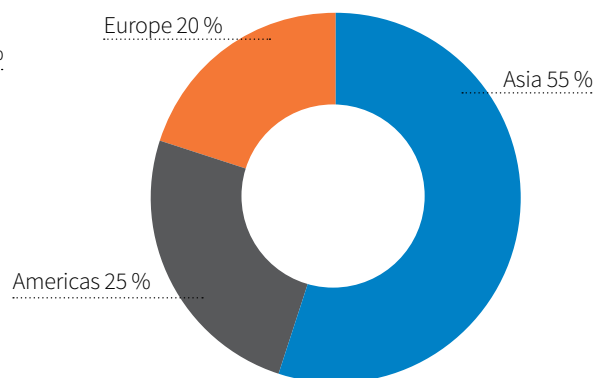
Pesmel Group Oy is an international expert in material handling. The company's highly automated handling, packing and storage systems improve the mills' internal logistics as well as product quality. The company has two main customer groups, metal and paper industry.

During four decades Pesmel has delivered over 400 handling and packing projects and around 120 storage systems. The company employs over 200 professionals, of which about 110 are situated in Finland.

Sales by business areas in 2015



Revenue by market areas in 2015



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Find your local representatives: www.pesmel.com/locations

Pesmel's sales team is ready

Our sales team consists of professionals who have a long experience and excellent knowledge of material handling in the paper and converting business. We'd like you to meet them and find out about their fields of expertise.



Niko Nyman

Product Engineer,
Paper and Converting

My duties include providing product support for sales, designing layouts in 2D and 3D, and managing our product portfolio.

I should be included right at the beginning of the design process, because at that stage we specify the preliminary solutions that respond to the customer's wishes and challenges.

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niko.nyman@pesmel.com

Jouni Räisänen

Sales Manager,
Storage Systems

My main responsibility is the sales of high-bay storage solutions.

I would like to be included in the discussions as early as possible, so that I am able to help the customer to find the best solution to their needs.

📞 +358 20 700 9622
jouni.raisanen@pesmel.com

Kaj Fahllund

Vice President,
Paper and Converting

I'm accountable for the paper and converting business, working at the customer interface and directing our organization in these areas.

I would like to be involved the discussions as early as possible when customers start planning changes, investments or have something else in mind related to material handling.

📞 +358 20 700 9626
kaj.fahllund@pesmel.com

Jani Matikainen

Product Manager,
Storage Systems

I provide support to the sales team in developing concepts, planning offers and acting at the customer interface. I also provide support in the project phase.

I should be included in the project at an early stage so that we can, together with the customer, design the most suitable storage concept for them.

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jani.matikainen@pesmel.com

Kari Terho

Product Manager,
Paper and Converting

I manage the kraft wrapping product portfolio.

I should be included in the process when the customer provides us with the preliminary requirements. This helps me in my work of choosing the correct equipment for the offer.

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kari.terho@pesmel.com

to serve you



Ari Mäkinen

Account Manager,
Paper and Converting

I am responsible for rebuild project sales and management.

I would like to be included in the process and discussions right when the customer discovers the need of a modification or rebuild so that I am able to help the customer to find the best solution to their needs.

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ari.makinen@pesmel.com

Veli-Matti Hirsimäki

Product Manager,
Paper and Converting

My main responsibilities include designing solutions for stretch wrapping concepts.

For me, it would be best to be included in the early stages of the customer's decision-making, so that I am able to present all our strengths and solutions before any final decisions have been made.

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veli-matti.hirsimäki@pesmel.com

It is vital that our specialists are involved in your project as early in the process as possible, before any final decisions have been made. This enables us to serve our customers better.

Risto Lehtonen

Sales Manager,
Paper and Converting

I'm responsible for the Valmet cooperation and sales projects in our paper business.

I would like to be included in the discussions as early as possible – even before the actual call for offers. This way, I am better able to introduce our concept and technology to the customer.

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risto.lehtonen@pesmel.com

Pekka Jormanainen

Account Manager,
Paper and Converting

I am responsible for rebuild project sales.

I would like to be involved right when customers discover that they need a rebuild, in the hope of being the first supplier candidate to contact the customer

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Mikko Mäki-Rahkola

Development Manager,
IT

I'm in charge of the development of Pesmel's software products and services business.

For me, the ideal time to be included in the project is when the mill layout is starting to get settled and discussions of the management of information flow begin.

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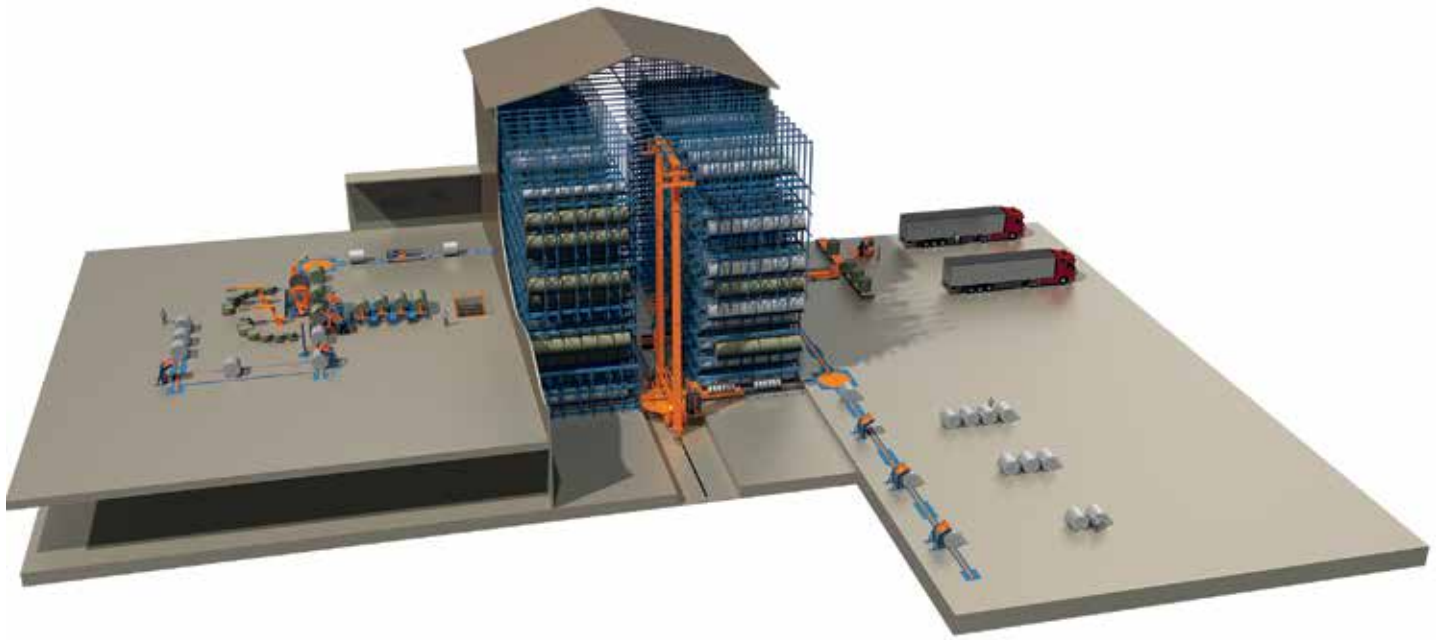
Marko Heikkinen

General Manager,
Service

I have overall responsibility for our Service unit, including sales, maintenance, rebuilds, spare parts, HelpDesk, and customer visits.

In new projects, I come into the picture when discussions of maintenance or HelpDesk contracts start.

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marko.heikkinen@pesmel.com



Material Flow How®

– putting it all together

Concept simulation

Handling

Strech packing

Kraft packing

Storing

Dispatching

Pesmel has 35 years of history and expertise, working with customized roll handling, packing and storage system deliveries. Our unique Material Flow How concept has all the elements required to create the optimal handling system, from winders to dispatching, allowing paper mills to take full advantage of their production capabilities.

We consider every customer to be unique and each project is planned and executed according to specific individual requirements, using the most suitable technology for the solution required. The key to an optimally functioning finishing system is a smartly and well-engineered system layout, and that knowledge is Pesmel's Material Flow How.

Our competence is based on four cornerstones; innovation ability, system and engineering know-how and, of course, flexibility. We lead the way as a single source supplier of bespoke finishing systems from engineering and manufacturing, all the way to our global 24/7 service.