



PESMEL MATERIAL FLOW HOW®

Handling Systems for Pulp and Paper

**PESMEL**

# Material Flow How® -concept

The idea behind the Material Flow How® -concept is to arrange production and material flows so that production efficiency is maximized and needed equipment minimized.

The implementation of Material Flow How® starts by building a simulation model, by which different production procedures and material flows are examined and bottlenecks analyzed.

The main components of the concept are automated TransRoll® storage, roll handling and packing systems, all fully integrated to Pesmel Control MOM (manufacturing operations management) system.

Our concept is completely engineered in-house, including mechanical, electrical, PLC and ICT engineering. This process results in one functional system that is easy to operate and maintain.

Material Flow How® -concept includes all roll handling operations after the winders:

- Handling
- Storing
- Packing
- Dispatching
- Loading



Due to the system and design flexibility, the concept is suitable for new as well as existing mills, and can accommodate all volume needs.

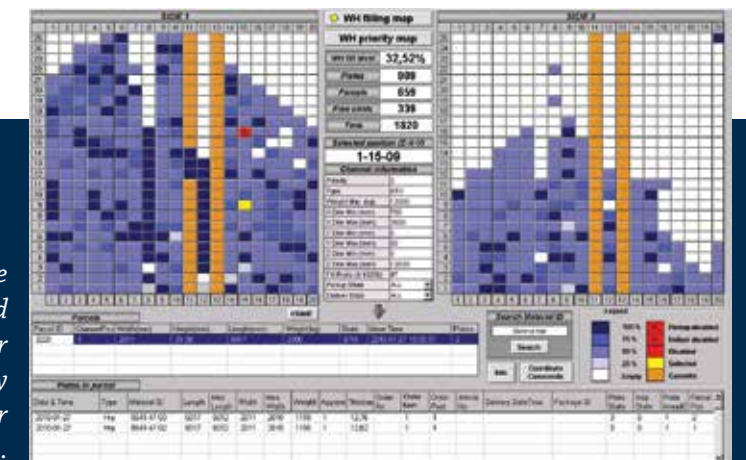
## WMS (Warehouse Management System)

Pesmel WMS integrates and controls material flows between production, storage, roll handling, and shipping.

Computer control system is controlling the storage and logistic functions and can be fully integrated with the mill's existing network and upper level control systems. The control system receives internal orders for different processes or customer orders for shipment.

Main task for WMS is to control the material flows between different processes and optimize the storage and logistical functions.

This increases the total capacity of the system and decreases the operating costs. Wide range reporting and diagnostical functions are included into the system.



Pesmel storage systems are controlled automatically and unmanned by Pesmel's own server PC-based WMS with the necessary number of client PCs for operator terminals.



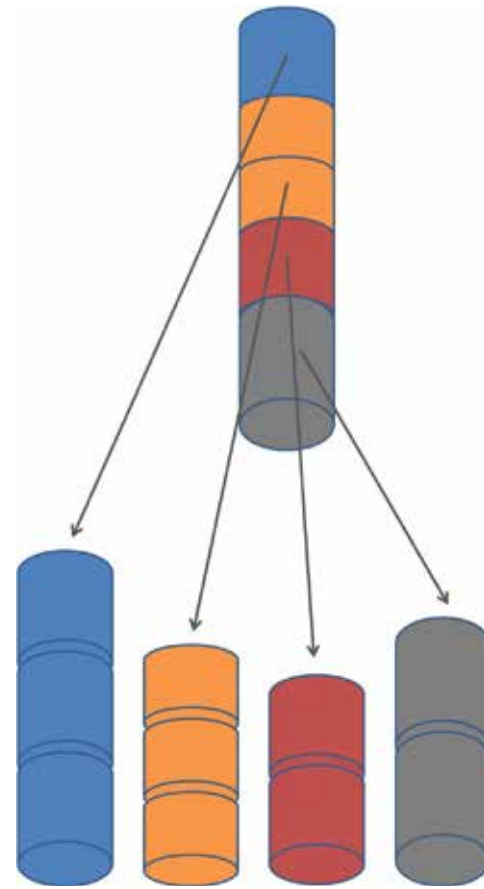
# Paper industry solutions

In paper mills, we have focused on the challenge of how to connect paper machines, converting and shipping in a way that each of these processes can be freely and individually optimized and maintained.

A smartly integrated Pesimal TransRoll® storage located between the main processes breaks a rigid production line down into smaller, individually more manageable processes with minimal amount of connecting conveyors.

TransRoll® storage is based on horizontal deep lane technology, which is extremely suitable for big storage volumes and high capacities. Storage can handle rolls or roll sets without limitations related to roll dimensions or packing variants. Rolls can be unwrapped, partially wrapped, or fully wrapped. It is also possible to store rolls and pallets in the same shared rack structure.

The almost limitless handling and sorting capacity separates TransRoll® storages from the other alternatives. With a stacker crane's normal handling capacity of 40-50 cycles per hour, and six to eight rolls per set handled by the channel vehicle, the roll stream in and out can be up to 400 rolls per hour, per stacker crane. This also equates to plenty of sorting ability within the storage as well during off-peak hours.



*The incoming roll stream is sorted by channel vehicle in the storage.*

Pesimal TransRoll® storing gives operational efficiency and cost savings with the following main features:

- Simplified layout with minimal number of integrated conveyors.
- Adjustable storage in all three axis, length, width and height.
- Smallest storage footprint compared to other alternatives.
- Minimised storage building costs by rack, supported walls and roof elements.
- Fire safety with zone divided sprinkler system.

*Secret for the high sorting and handling capacities is multi-roll handling without limitations related to roll dimensions of packing variants.*

*TransRoll® storage works like a big sieve. Mills roll stream in and out can be done freely from multiple points and levels along the rack structure sides. Rolls are moved in and out in a horizontal position directly from standard conveyors.*



Paper roll packing methods can be divided to two main categories: kraft and stretch film wrapping.

Suitable packing method is evaluated case by case taking into account available space, needed product protection level and total investment and operating costs.

Pesmel packing lines are based on module structure, which makes them easy to adjust to each customer's specific need, such as space, capacity, and packing code requirements. Roll stream can be handled by conveyors, transfer shuttles or roll ramps.

For existing mills with ongoing production, we understand that short installation and commissioning is a must. Our shop-tested line, built on base frames with quick connectors for wiring and piping, can be put on full production in a few days window.



*Over-lap wrapping method offers a cost efficient and space saving solution to wrap wide rolls.*



*Fully automated multi-station OptiWrap for all capacity needs.*

## Kraft paper wrapping

Kraft wrapping has strong corner and end protections specially against mechanical stresses in over-sea deliveries. This packing method is recommended especially for paper and board grades, which require the strongest protection.

As a contract supplier of Valmet, we provide kraft wrapping systems according to OptiWrap product family.

OptiWrap offers innovative and cost efficient wrapping solutions for all capacities, ranging from a flow of 30 rolls up to 180 rolls per hour.

## Stretch film wrapping

Stretch film wrapping is ideal for rolls with short transportation chain and mills with limited space. With less equipment and packing materials needed, stretch wrapping system has relatively small investment and operations costs.

Stretch film as a packing material has excellent qualities. It gives complete protection against moisture and dirt, and the material itself is fully recyclable. The film folding function gives extended protection to roll corners.

*Automated axial and radial wrapping with 80 kgs material rolls ensure continuous packing and high capacity.*



## Packing line features:

- Fully automated packing functions.
- High capacity packing machines, capacities up to 180 rolls/hour/line.
- Automated wrapping material changing, allowing unmanned continuous packing for 24 hours.
- Big material rolls for example, in axial wrapping stretch film rolls up to 80 kgs/cam and in radial wrapping up to 500 kgs.





# Pulp industry solutions

TransBale is a logistic system that buffers and sorts pulp bale units by product type and customer order, and controls all dispatch operations. It was developed from Pesimal's TransRoll system, which handles and stores rolls of paper. The main difference lies in the nature of the bales of pulp, which have more irregular shape and their dimensions vary due to a variety of production factors, such as the level of moisture in the pulp.

TransBale handles the pulp bales from the bottom, which allows it to cope with differently sized and shaped loads. In storage the stacker cranes store the bales on racks, rather than stacking them on top of each other. With clamp truck handling, the maximum height of a stack of pulp bales is four or five units. With TransBale, this is increased to 15 units. TransBale's stacker cranes are highly efficient, very fast, and completely automated. One stacker crane has the same throughput as four or five clamp trucks, and it does not require an operator.

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 a 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 TransBale system can cope with first-in, first-out loading, and it can do sorting as well. It also features a number of sophisticated tracking and optimization features.

TransBale is not just an effective storage solution, it is also a cutting-edge logistics situation. It works as a key link in the logistical chain, wherever that may be. It can be utilized at mill sites as a link between production and transportation, synchronizing production with the logistics chain. But it works equally well in harbors, where trains arrive to unload bales of pulp for ship transport. TransBale is the ideal solution for the intermediate storage of the many bales of pulp which need to wait at the harbor to be loaded onto ships.

TransBale boosts the entire production and logistics chain in the pulp process with an offering that is unique in its flexibility, simplicity and utility at both ends of the logistical pipeline, the mill and the harbour.



*TransBale handles the pulp bales from the bottom.*

*Deep lane solution makes it possible to store larger amounts of material in a smaller space.*



*With a smart system like TransBale automated infeed, storage and retrieval, as well as the loading and unloading operations, you can greatly increase the efficiency of the entire system.*



# Dispatching & loading

With sophisticated dispatching system customer satisfaction and selling efficiency can be increased. Key elements when designing dispatching system are automation, selection of storing technology, and usage of market and customer information.

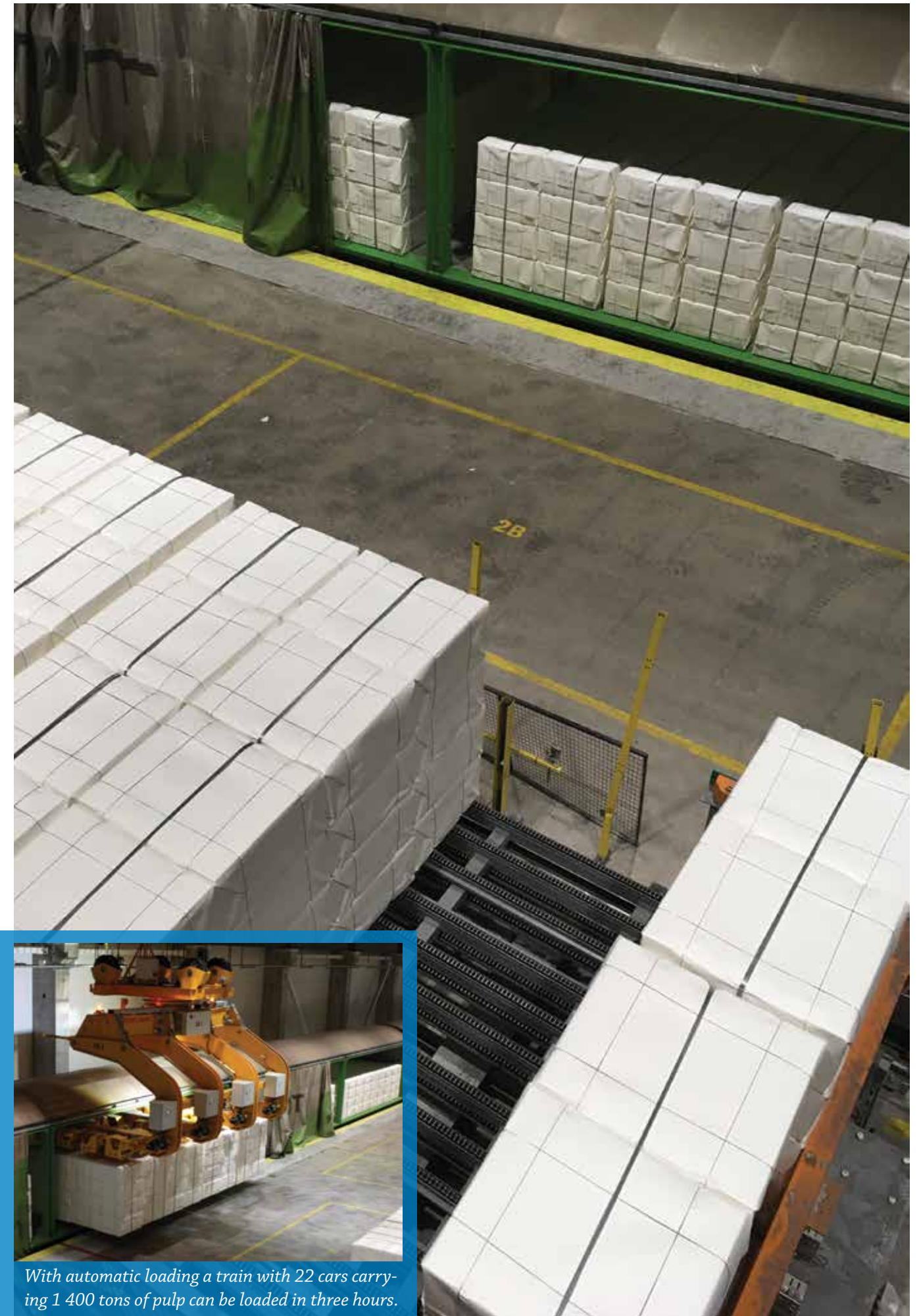
By combining the customer and market information with WMS controlled TransRoll or Transbale storage, our customers have been able to increase their selling up to 15 percent.

Automated loading system is an excellent solution for the products and high volumes of pulp and paper industry. The key issue of the system is fast loading with gentle product handling.

Pesmel loading systems have a control system with optimal load and transport documentation functions. The user interface is designed so that even non-frequent users, such as drivers, can operate it easily.



*Automated truck loading or unloading procedure takes only five minutes and is done without any clamb truck handling.*



*Load forming and sorting is done automatically by TransRoll® stacker crane.*



*Sea cassette load forming and loading is done automatically in six minutes.*



*With automatic loading a train with 22 cars carrying 1 400 tons of pulp can be loaded in three hours.*

*Material Flow How®*

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