

# IDEAL MATERIAL FLOW HOW® with superb internal logistics at Outokumpu



PHOTO: PESMEL

One of the greatest benefits of the Material Flow How® concept is the ingenious mill layout.

Pesmel is all about smooth internal logistics that seamlessly connects the production process and storage operations, without any bottlenecks or unnecessary steps. Outokumpu’s RAP5 cold rolling, annealing and pickling line in Tornio, Finland, represents the perfect union between storage and production.

In ideal internal logistics, storage is not just storage. Instead, a storage facility is a carefully designed internal distribution center that forms an integral part of the production process and ensures a fast and flexible material flow, increasing the production output of the whole mill a notch or two. Pesmel’s ideal solution achieves this through an ingenious mill layout where storage facilities are built right next to the processing line from start to finish.

Pesmel and Outokumpu share a long history. Pesmel has delivered high-bay storage solutions and packing lines to several Outokumpu production units in Finland, Sweden and the Netherlands. Recently, the two have also been working together in software development.

### Built for maximum efficiency

At Outokumpu’s RAP5 line, in operation since 2003, the production process is integrated with a single long high-bay storage facility that offers great capacity in a simple layout. The facility is more than 500 meters long, 30 meters high and 7.5 meters wide, and it houses up to 2,000 coils with a total weight of 60,000 tonnes. After more than ten years of operation, this solution’s level of integration is still unmatched anywhere in the world, which clearly demonstrates Outokumpu’s position as a pioneer of advanced production technology and concepts.

The storage capacity can be flexibly adjusted for various product types and coils that are at different stages of the production process. The same storage system houses the hot-rolled coils used as raw material for the line, all the cold-rolled coils waiting for the next processing phase, and finished and packed products ready for delivery. This removes the need for many separate storage units located around the mill complex.

The streamlined process and real-time control help eliminate delivery errors and shorten lead times considerably. Optimal material flow can be maintained with a smaller buffer. Furthermore, the storage solution uses no cranes that could damage the coils. Instead, coils are always lifted from below with cushioned elevators, which ensures the flawless condition of the final product. The lack of overhead cranes also means a safer working environment for the staff.

### The integrated internal logistics and production process

In this integrated solution, the machinery automatically moves the coils to and from the production line as they go through various processing phases. The entire system is very simple: three elevators and approximately ten transfer carriages are able to manage all operations.

The figure below describes the joint process of the RAP5 line and the integrated high-bay distribution center. Hot-rolled coils arrive at the production line on a special carriage that holds four coils, and are automatically unloaded into storage.

When the RAP5 line is ready for the coil, the elevators and carriages quickly bring it to the right place, and processing begins. During production, the coil may move between storage and the production line several times, depending on the specific process chosen for each coil.

After the cold-rolling process for the coil is complete, it enters Pesmel’s packing line, also built right next to the high-bay facility to complete the ideal layout. The packed coil returns to the same high-bay complex to wait for delivery. Finally, the coil is automatically loaded into a transfer carriage and taken to the appropriate means of transport – in Tornio, this is most often a ship waiting at the mill’s own port. •

