

Mondi – flexible production and distribution for paper production

Groundbreaking logistics solution in the paper industry

Mondi Neusiedler now has a completely continuous in-house logistics system covering all processes from paper production to delivery. This challenging project ranges from system design and implementation to the complete modeling of the complex

material flow. Mondi used the COPA-DATA zenon software suite for the visualization of all production and storage processes. The in-house transport and logistics equipment was delivered by Hörmann Logistik.



Mondi has about 33,000 employees in 35 countries worldwide, producing about 1.5 million tons of office communication paper with 10 paper machines as well as two million tons of pulp – impressive numbers that the Vienna-based company is really proud of. Besides Europe, the growing markets today are Russia and South Africa. Nearly one half of all sales are made in these markets – with the trend continuing upwards. The reasons for this success are numerous. However, the most important reasons are strict cost control, tight organizational structures and a continuous increase of productivity over the past ten years.

ELABORATE SUPPLY CHAIN

An optimized supply chain connecting all processes along the value-added chain contributes significantly to an increase in productivity. In addition to the production processes, this increase also includes the logistic processes in the company. The

increasing requirements of “just-in-time” deliveries and the need to increase flexibility led to the initiation of the logistics project at Mondi. Mondi Neusiedler has been using products for internal logistics by Hörmann Logistik from Munich since 1997. Hörmann Logistik is a full-line provider for in-house material flow technology, offering complete solutions for production, storage and distribution logistics. This includes automatic high-bay storage areas and small-parts stores, consignment systems, conveying systems, workpiece carriers, distribution vehicles, driverless transport systems and radio-controlled forklifts.

CONTINUOUS MATERIAL FLOW, FROM PAPER MACHINES TO SHIPMENT

With this common project at Mondi Neusiedler, the cooperating companies created – for the first time in this industry – an intra-logistics system for paper processing that is completely embed-

ded in the production process. The three-lane high-bay master roll storage used today is 35 meters high, 140 meters long and has over 6000 storage slots for rolls with a weight of 4.4 tons. In this fully automatic storage, up to 26.000 tons of different sizes of paper rolls can be stored and handled using stacker cranes. Each of the cranes weighs 43 tons and places the heavy paper rolls using barcodes. The storing itself is random, but the rolls are distributed evenly across the lanes, according to their size and weight. Ten driverless transport vehicles load and unload the master roll storage. These radio-controlled vehicles can carry a maximum weight of 4.5 tons and use reference magnets in the floor to navigate. Depending on the current order, the master rolls are delivered to six cross cutters. Radio-controlled delivery management ensures that the transport paths are always used optimally. Belt conveyors ensure a low noise level and reduce the risk of damage to the transported items. The throughput of two conveying lines is about 7,000 cartons per hour.

The cross cutters deliver the packaged paper to conveying lines that group the cartons together and store them in an intermediate storage. The conveying lines can transport a total of 3,500 cartons per hour. This way, maximum throughput is ensured. The visualization with zenon both displays and documents the whole material flow in real-time – on every connected PC. The employees in charge can tell which orders the cartons are associated with, even if they are not labeled – by tracking the position of the cartons in the line. From the intermediate storage, the grouped cartons are delivered to four palletizing robots, which automatically stack them according to different pallet schemes.

The pallets arrive from the two-lane high-rack storage that stores over 80 disposable empty pallet types including the packaging material required for each of them. The empty pallets are

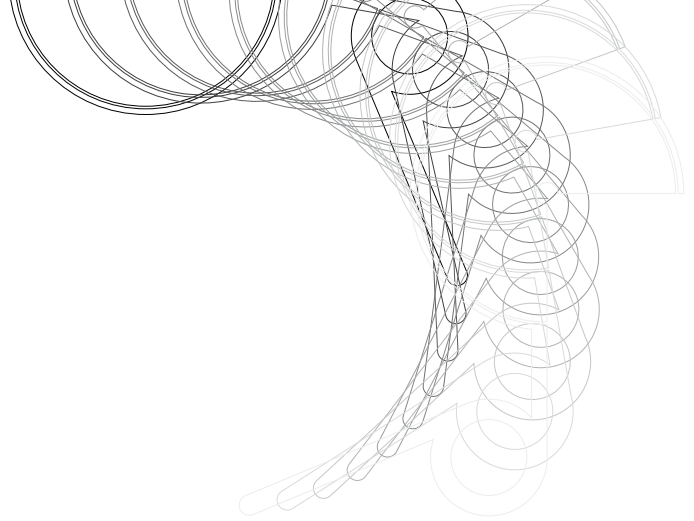
automatically delivered into the palletizing process via robots. This way, about 8,000 cartons can be palletized per hour. After the packaging machine, which centers the pallets and shrink-wraps them in protective foil, the pallets are labeled, for example, with a scannable loading device number. A power trolley system then transports the pallets into the different zones of the finished goods store. Each of the hangers is identified via a transponder and guided to its designated storage location by the system. In the ten-lane dispatch storage, stacker cranes take over the pallets and store them according to the strategies provided by HiLIS. The storage can take a total of 16,500 tons of paper. This high-stack storage is 100 meters high and 31 meters long, giving room for over 23,300 pallets. Mondi are proud of a daily loading capacity of 2,000 tons. The goods are removed from stock and prepared for shipment on the other side of the storage. From there, they are delivered to customers worldwide by road or rail.

SOFTWARE MONITORS AND CONTROLS ALL LOGISTIC PROCESSES

The integration of the entire system, from the paper machines to the shipment of the finished product, is performed with HiLIS, the “Hörmann intra Logistics System”. HiLIS manages, controls and monitors all processes, ensuring transparency and equipment availability in all functional areas. These areas include control, visualization, material flow, inventory management and communication interfaces. The interconnected management of all these areas ensures the optimum and economic use of each single area. The interfaces to the production software were also designed and implemented by Hörmann Logistik. HiLIS contains all required functions, from storage and processing to the shipment of goods. All data is stored in an Oracle database. COPA-DATA’s zenon is a part of this comprehensive

Thanks to the visualization with zenon, all logistics processes are displayed in detail and allow users to control and monitor all current processes in a user-friendly way.





solution. Mondi uses it for the visualization of the material flow on the conveying lines and for displaying information from the different storage areas. The entire system stretches over a length of more than one kilometer and several halls. zenon visualizes all processes in the master roll storage, in the pallet storage and the palletizing hall, monitoring the paths and storage actions all the way from the master roll via the separate cartons up to the ready-packed pallets in real-time.

The material flow is based on a very complex information flow. All information – about the color and quality of a roll, for example, is delivered from the production system to the logistics system. If a cross cutter demands paper, the systems checks the availability of the required type of paper and, if possible, triggers the transport process. After the paper has been cut and packaged, data such as format, size and paper specifications are stored and provided for further processing. During palletizing, further information specifying the order and the customer is added. All information is available for all involved employees 365 days of the year. This data is provided by about 20 Simatic S7 PLCs. All computers in the plant are connected via the TCP/IP communication protocol. The zenon application has a centralized, consistent and transparent structure, consisting of an integration project and three sub-projects. Mondi attached great value to the simple handling of the system. zenon allows every single user to get a complete overview of all conveying and storage processes – even if the plant stretches over a wide area. Alarm management and alarm handling are therefore given top priority. There is one alarm message list for the whole facility. Thanks to plain text information, all employees can understand the messages and how they have to react to them. If a user acknowledges a message, their name and computer as

well as the date/time of the acknowledgment or deletion is recorded. In order to analyze and monitor equipment availability on a long-term basis, Mondi now uses the statistical analysis functions in zenon, evaluating key data like alarm frequency, down times etc. This allows them to stay ahead of the competition not only in the present, but also in the future.

THE SOLUTION:

- ▶ High-rack master roll storage with three lanes, 35 meters high, 140 meters long, over 6,000 storage slots for rolls weighing 4.4 tons each, a total capacity of 26,000 tons
- ▶ Radio-controlled delivery of the master rolls to six cross cutters with driverless transport vehicles
- ▶ Conveyor lines transport 3,500 cartons per hour at a speed of 3.6 km/h
- ▶ Four robots palletize up to 8,000 cartons per hour
- ▶ High-rack storage with two lanes for packaging materials and empty pallets with automatic delivery to the palletizing section with two robots
- ▶ Finished goods storage with ten lanes
- ▶ Tour-based loading capacity for 80 trucks per day
- ▶ High-rack storage with 23,300 storage slots and 10 lanes on 16 levels
- ▶ Storage and transport of 80 different pallet types