



→ Since the timeliness of printed news depends on how quickly it reaches the reader, the production of daily newspapers is continuously subject to extreme deadline pressures. The Swiss company Ferag AG, located in Hinwil near Zurich, specializes in the necessary conveying and manufacturing processes for further processing of newspapers that follow the initial printing process. Ferag has developed production modules with high-tech controllers for NZZ Print, the print shop of the 'Neue Zürcher Zeitung' (NZZ = New Zurich Times), equipped with Beckhoff CX1020 Embedded PCs, the TwinCAT software PLC and EtherCAT.

Ferag AG: EtherCAT ensures fast, precise newspaper printing

PC-based control is "in the news" for the Neue Zürcher Zeitung (New Zurich Times)

The end product, the 'Neue Zürcher Zeitung', comes folded and cut out of the printing press line. Depending on the size of the issue, special newspaper sections and supplements, which make up a considerable share of the revenue, must be laid automatically inside the main newspaper. At least that is the case at NZZ Print, which has fully automated this process using the state-of-the-art machines from Ferag AG. After the inserts, the address of the recipient is printed on the newspapers and on the accompanying tickets for the newspaper parcels. Finally, the dispatch units are created by wrapping them with a plastic film. Tracking the newspapers through the entire production process is an essential part of the application.

Modularity as a matter of principle

NZZ Print uses virtually the entire range of processing modules offered by Ferag. "From the point of view of the newspaper manufacturer, one buys a powerful print line and the modules necessary for further processing. Ferag offers a great variety of powerful modules so all our needs are covered," comments Yvonne Hug, Finishing Dept. Manager at NZZ Print, who is responsible for the entire NZZ further processing area.

The linking conveyor equipment is a most spectacular sight for the observer: as if on a string of beads, the newspaper sections are conveyed on the typical Ferag yellow clips at breakneck speed in all directions through the plant – horizontally,

vertically, crossing the room – everything works with absolutely no errors. “Even if the conveyor equipment is impressive, it is by no means an extraordinary technical specialty,” explains Yvonne Hug, and she continues: “The processes that have to take place in the modules linked by the conveyor equipment are much more interesting.” Roland Kunz, Project Manager for Software Engineering at Ferag AG, agrees with her: “We have been able to convey quickly for ages, but insertion, addressing and packaging are much more important. It is just a compulsory requirement for the correct addresses to be in the respective bundles.” Even sorting, as a downstream task, is prepared and supported in this way.

The NZZ weekend edition in particular is very extensive and is produced in several different printing runs. “For the Finishing Dept., this means that the previously printed newspaper sections have to be stored intermediately and, during the night production phase, integrated in the complete product in the appropriate order,” says Yvonne Hug, explaining the sequence.

Ensuring optimum availability

“The high availability of all processing stations represents a decisive factor for us,” explains Roland Kunz, adding: “In many cases there was still a need for optimization during the implementation and adaptation of the individual processing modules on site. Therefore, it was preferable to create redundant plant concepts rather than having to accept a failure rate.”

“The reliability of the plant components is decisive for their numbers, whereby we have two of virtually everything in the Finishing Dept.” says Yvonne Hug. “This type of security is indispensable in any newspaper production facility, because the



Printing on the fly: for a perfect finish, the positioning of the newspaper and the printing of the address in the field provided on the cover sheet must be synchronized precisely.

Newspaper processing at NZZ Print: the plant capacity is designed for 220,000 copies. The newspapers are transferred to the clips of the chain conveyor system and transported to the respective processing stations.



newspaper produced during the night is supposed to be available to the reader by the early morning." The high demands on the machines or modules result from this expectation. This concerns, for example, the machine operation, flexibility in adapting production conditions, interaction in the form of visualization, display of process status and the like. "Since these functional features are also considered by NZZ Print to be very important, we have ported the previous control concept to the modernized, powerful platform from Beckhoff," Roland Kunz reports. As Yvonne Hug explains, the implementation of the project at NZZ began about two years ago; the awarding of the order to Ferag and the first talks between Ferag and Beckhoff took place as early as 2003/2004. "We assembled, commissioned and integrated the new plant parts in the existing area without having to interrupt the production process. The implementation took place step by step as we approached the expectations that had been set very carefully," Roland Kunz remembers. "Above all, we had to carry out various tests for the printing of the addresses. For this reason, older parts of the plant were still operated in parallel during the conversion phase."

Flexibility to ideally suit needs

Four lines lead from the new Rotation, as the print line in Zurich is called, to the Finishing Dept.; two of them are main lines, which integrate the insertion area and lead to the packaging area. The two remaining lines are implemented as so-called auxiliary lines. The redundant plant concept covers capacity requirements and, over and above that, serves for production safety. "The possible capacity depends on the scope of production, but it can be up to 80,000 copies per hour," explains Yvonne Hug, pointing out that the number of previously printed sections is decisive. "The wet production is almost always the same as far as the amount of material is concerned. The Finishing Department's workload is unfortunately not as steady: we have daily production from 8 am to 5 pm. The night production hooks on to that. This is why we have two shifts."

Leading control technology for today's complex tasks

On the control side, the individual workstations are controlled by the CX1020 Embedded platform with EtherCAT Terminals, networked via EtherCAT. Embedded PCs are overlaid by a control technology that was developed by Ferag. In deciding in favor of Beckhoff, one important argument was that Ferag already had experience with TwinCAT control software. After all, a large number of software components had to be ported when replacing the previous control system. Besides that, as Gerhard Meier, Managing Director of the Swiss Beckhoff branch office reports, the desire was also to erase the capacity limitations of the previ-



The Beckhoff CP77xx and CP69xx Control Panels are used as operating terminals and were manufactured as custom versions especially for Ferag. The CP62xx Panel PC version is also used.



The stacker requests a cover sheet, whose labeling is assigned by the control system to the inkjet printer via an Ethernet connection. The master computer manages the address or logistic data. The synchronization of the printing process and the positioning of the newspaper are controlled by the stacker, or rather the CX1020 Embedded PC.

ous control system: "The use of EtherCAT with all of its technological benefits was a decisive argument here. Previously, a great many special solutions were used with proprietary hardware and local I/O components. In contrast to that, EtherCAT offers flexible topology and extremely high performance. Specialized modules that were previously implemented in hardware form can now be realized in software."

As the first Ferag modules, the three most important stations were equipped with the CX1020 Embedded PC: the stacker, for packaging; the release controller, which controls the inlet of the newspapers to the stacker; and the MultiSert insertion drum. "Those are the areas that we have been able to convert to the new control platform so far," comments Kunz and he continues: "The conversion required a considerable degree of dedication because on the one hand, training on the new platform is important, and on the other, the project planning for the machines must be adapted to this new control platform strategy."

High-performance EtherCAT permits synchronization with microsecond accuracy

Using EtherCAT as the fieldbus system has proven to be the right decision for Ferag. Besides the real-time characteristics, the simple installation, ultra precise diagnostics and the possibility to communicate with older CAN-based devices in the plant via gateways have all proven to be important.

One special feature of the control solution used at the NZZ is the use of the

EtherCAT bridge module, which enables the bidirectional transfer of data from one EtherCAT strand to another. Both strands can also be synchronized via the bridge. An external infeed ensures that the main branch can continue to communicate when the auxiliary branch is switched off. Roland Kunz explains that, for example, the release controller handles the exact positioning of the 'released' newspaper in front of the ink-jet labeler and that this process must neither be interrupted nor allowed to get out of control. Reliable release can only be guaranteed using EtherCAT and fast I/O modules. "On account of the high speed involved, the synchronization of the controllers is also very important with respect to the transfer of the newspapers from one transport system to another, which means that we cannot do without cross-communication between the Embedded PCs", explains Roland Kunz. "Synchronization between communication devices that are far apart is further improved by the use of the EtherCAT 'Distributed Clocks' function. Synchronization with microsecond accuracy," says Gerhard Meier, "is only possible with EtherCAT."

→ Beckhoff Switzerland www.beckhoff.ch

→ Ferag AG www.ferag.com

→ NZZ Print www.nzzprint.ch



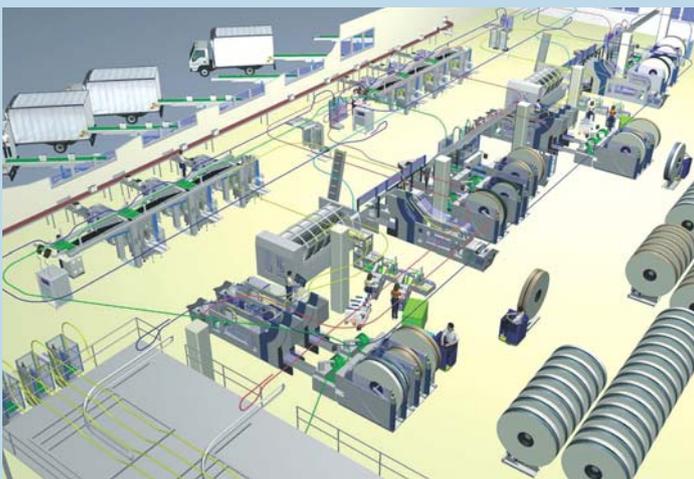


Neue Zürcher Zeitung: Generation 3 in production

NZZ Print put two new Ferag further processing lines into operation in the summer of 2007, concluding a complete renovation project that has lasted several years. The third mailroom generation by Ferag is now in use, with two Multi-SertDrums, RollStream, MultiDisc and MultiStack.

A distinctive new building has highlighted the NZZ building complex in Schlieren near Zurich since 2004. A year before its 225th anniversary, the Neue Zürcher Zeitung began production on one of the world's most modern newspaper printing machines.

Three years later, the complete renovation of the printing center was completed with the commissioning of the two dispatch lines by Ferag. In no less than 25 conversion steps, the previous plant was replaced by two high performance systems of the latest generation. As opposed to the original plan, according to which the old printing press wing was supposed to offer space for the further processing machines, the system was installed in the same space, whereby daily production was not to be affected and two lines always had to be available. To make matters more difficult, the floor surface was also renovated during the course of the installation. Only the dedication of both sides made the smooth implementation of this demanding task possible. "Ferag mastered the challenge with flying colors. The care and skill with which the planners and assemblers worked was impressive," testifies Yvonne Hug, Further Processing Manager.



A matrix points system connects the printing press to the Ferag systems and allows flexible control of the insertion lines with the four UTR transporters linked to the folded deliveries. That allows a high degree of freedom in production planning with constant optimum utilization of capacities. "We evaluated the system and the individual components precisely from the technical and economic points of view. Ferag offered the best solution to our requirements in every aspect. The high degree of flexibility and the usage possibilities are outstanding features of the Ferag system and played an essential part in us selecting this supplier once again," says Yvonne Hug.

Around 150,000 copies of the Neue Zürcher Zeitung run through the two production lines every night; in the case of the NZZ am Sonntag (NZZ on Sunday) it is over 160,000 copies, with lengths of 140 pages and more in broadsheet format. The Sunday edition has a large number of inserted products. To cope with the high volumes, supplements are inserted in the preliminary products during the day and placed at the ready on the MultiDisc for the night production. "We have gained on performance. Compared to the previous plant, which was almost 18 years old, we are achieving an increase in the insertion speed of almost 30 percent," Yvonne Hug points out. "We use the increase in production performance primarily for the manufacture of the 'NZZ am Sonntag'. In addition, it is possible to set the press deadline to a correspondingly later time."