

Retrofit in Spandau printing facility, Berlin



Optimized dispatch of 1.2 million newspapers

A retrofit was carried out on the transfer area of the dispatch ramps in Druckhaus Spandau, the Axel Springer AG's printing house. A ramp disposition system developed by EQUAL Software supports the IT coupling with the production control system and enables precise control of the bundles of newspapers. The control centerpiece is a CX series Embedded PC with Beckhoff's TwinCAT PLC software.

Axel Springer AG is one of the largest media groups in the world. Probably its best known product is the Bild newspaper, produced as partial editions at the printing house Druckhaus Spandau in Berlin, Germany. The range of orders undertaken by the printing works includes a total of nine daily and five Sunday newspapers and job printing for various market segments. Around 1.2 million newspapers are produced and dispatched fresh from the press daily.

Besides the printing, one of the most important tasks undertaken by a newspaper printer is the dispatch of the print products. As readers expect

to begin reading their newspaper early in the day, on-time delivery is obviously very important. For this reason, in the course of a comprehensive retrofit, Druckhaus Spandau also modernized the dispatch department and implemented an additional IT coupling of the operative transfer area, known as the ramp. While the plant as a whole was retrofitted by the existing plant supplier, the IT coupling of the ramp and production control system was carried out using a ramp disposition system (RDS) that was developed, implemented and commissioned under contract from the Swiss company EQUAL Software AG.



The Axel Springer AG
printing house
Druckhaus Spandau

The project partners (from left to right): Daniel Althaus,
managing director of EQUAL Software AG, with Frank
Wagner, head of further processing, and Michael Wennler,
production manager for further processing, in the Axel
Springer Verlag printing house Druckhaus Spandau

Coupling of PLC and IT on one hardware platform

EQUAL Software, whose headquarters are in Zofingen, Switzerland, is a service provider in the software development sector. The business model is called Customized Software Services and aims to provide industrial customers with professional software solutions which are on schedule, economical and functional. The technological basis for the development of the service-oriented software architectures is Microsoft's .NET Framework which, especially using the WCF (Windows Communication Foundation) platform, offers excellent support for solutions with distributed systems. EQUAL Software AG has developed a framework for distributed systems on this basis which can be used for various applications.

For Druckhaus Spandau's ramp disposition project, EQUAL Software uses a Beckhoff CX1020 Embedded PC for each ramp group with Windows XP Embedded operating system and TwinCAT PLC software, Beckhoff Bus Terminals and a 15-inch Control Panel with touch screen as the HMI. This enables implementation of the operative control system for the plant as a PLC application and the IT coupling in the form of independent modular software components on a single hardware platform.

Targeted task control

Depending on the product, method of dispatch and recipient group, Druckhaus Spandau produces everything from specific bundles all the way to individually addressed subscription copies from the print products. These bundles need to be packaged and have to be placed ready for the designated carrier or pickup person at the correct time on the appropriate ramp. The services are primarily based on the end-to-end data flow, i.e. on the IT concept for task control as well as on the operative control of the dispatch and ramp equipment.

The ramp disposition system is embedded in the retrofit of the dispatch room which follows on from the rotation and inserting areas and in which all further processes up to the collection or dispatch of the print products take place. "Automation of the ramps using the new control system must therefore be viewed in combination with the upstream processes," explained Dipl.-Ing. Frank Wagner, head of further processing in the printing house, Druckhaus Spandau. The complete task control for the inserting and packaging machines takes place in the dispatch area using the Mailroom Production Control (MPC) system by Müller Martini. A central module, MPC Dispo, transfers order data from the higher-level customer system and distributes this to the



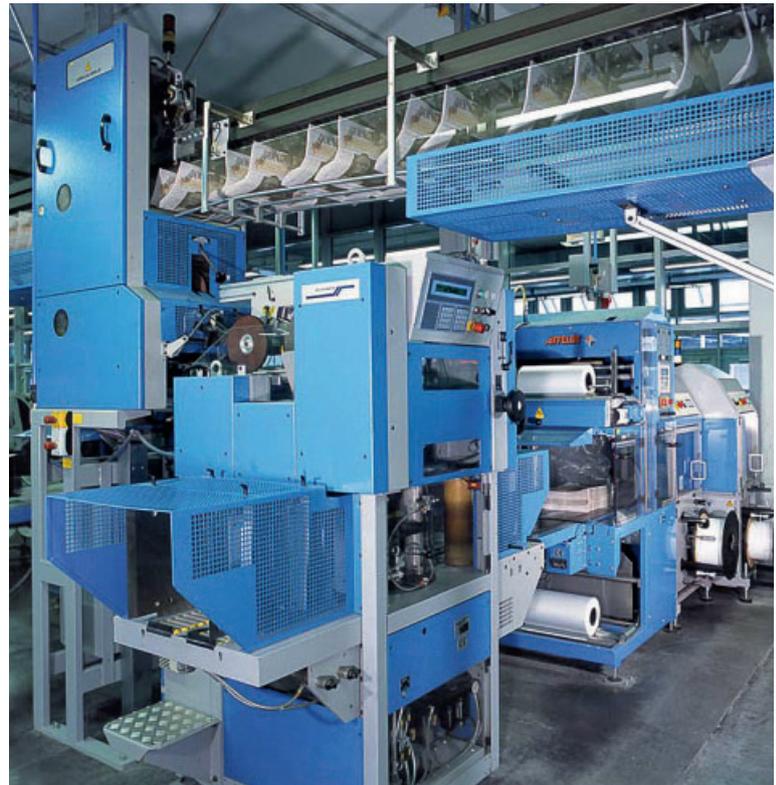
A total of 38 ramp belts are available for package loading onto HGVs. The ramp group system is controlled using a Beckhoff Control Panel.

The stacks of newspapers travel by conveyor belt to a fully automated packaging machine where they are sealed with plastic film. The packaged units are taken by transport system to the loading station.



line control for the inserting systems (MPC line control). The MPC LCs undertake control of the inserting machines, inkjet and cover sheet applicator systems and stackers. The nine line control systems are connected to the RDS using nine ramp groups, known as ramp group systems (RGS). Each RGS has a CX control system which interacts with the control panel. The information display for the ramp personnel and drivers is controlled by another separate dock display system. This system receives the relevant information from the RGS and creates the display according to specific criteria.

The RDS includes various solution and system components. A ramp disposition manager (RDM) – assigned as the gateway between the dispatch room and ramps – communicates the order data which it receives from the MPC to the ramp group system manager (RGS manager). This in turn distributes the order data to the RGS control PLC. Implementation of the orders, including time and number, i.e. the completed transfer of the bundles to the carrier, is



notified to the MPC so that the current assignment situation is always recorded in the production planning and control system. This makes the MPC a control system that is able to manage order control for the entire dispatch room: a control function not available before.

Multivariable platform strategy

At the beginning, implementation of the Beckhoff embedded platform with TwinCAT PLC software was not part of the retrofit project. "The original proposal was based on an alternative control concept," Frank Wagner explained. "The decision in favor of the Beckhoff platform was made in view of the long lifespan of printing machines and the continuous operation with 20 shifts per week. This places very specific requirements on the operating resources." Michael Wennler, production manager for further processing and the expert



From late evening, the first editions of the daily newspapers are collected from the ramp and driven to the individual distribution points.

Further processing system at Druckhaus Spandau: the Mailroom Production Disposition Controller (MPC DC) controls tasks throughout the complete dispatch room from inserting to packaging. The line control systems which are the so-called Mailroom Production System Line Controllers (MPC LC) are subordinated to the MPC DC. The Ramp Group System (RGS) connects to the nine lines. The Ramp Disposition Manager (RDM) communicates the order data which it receives from the MPC to the Ramp Group System Manager (RDS manager).

responsible for production planning and processing in the dispatch department of the printing house Druckhaus Spandau. He added: "Our expectations of the machine control systems and their infrastructure are first and foremost for high availability, simple operation and functionality. In the operating phase, the controllers need to be low-maintenance and user-friendly. Finally, they need to fulfill certain aesthetic requirements and the components should be available over the long-term."

"Our products fulfill these requirements," stressed Gerhard Meier, managing director of Beckhoff Automation AG, Switzerland, who provided support for the project. "Our computers, i.e. the motherboards, can still be repaired after ten years if necessary. A further advantage of our control solution is that since 1995 we have been using Bus Terminals for the I/O coupling which have remained in the same format, despite enormous technological advances. What might change would be the CPUs, to which the same existing Bus Terminals can be connected. This means that only the Software has to be adapted to the new CPU; the remaining parts of an application remain unaltered."

Building on standards enables renewed focus on what is most important

EQUAL Software has been working successfully with Beckhoff for some time. As Daniel Althaus, managing director of the company, confirms, the Beckhoff platform has some basic advantages which have also had a positive effect in the current project: "The Embedded PCs undertake the operative control of the ramp groups on the one hand, and on the other, they provide the dispatchers which define the routes for the packages with an interface to the RDM manager. This provides information on what must be sent or distributed where and when. The operational interfaces in use are the Beckhoff "Economy" Control Panels with 15-inch touch screen. The RGS also transfers the data to the DockDisplay."

The software systems from EQUAL Software AG are based on the .NET Framework from Microsoft. Daniel Althaus explains: "We went for the .NET Framework because the advanced development state of this platform enables easy solution identification. We no longer need to worry about details such as software or network interfaces and can concentrate on solving the actual problem. Naturally we find the proximity of Beckhoff's control technology to the Microsoft environment very convenient."

New control platform installed during operation – no downtime allowed

One condition set by Druckhaus Spandau was that the project implementation should take place without any production downtime i.e. during operation. This method of working was complied with. At certain times, one line could be kept free and retrofitted. In addition, it was always possible to change over to a switch control system, i.e. to switch back to the old machine control systems which were still in the control cabinets, if this was necessary for operational reasons.

Those in charge of the project in the printing house Druckhaus Spandau are very pleased with what has been accomplished. For Daniel Althaus from EQUAL Software AG, this has proved his company strategy correct once again: on the one hand, the framework developed in-house provides the solution to complex IT tasks, on the other hand, the Beckhoff automation platform has proven itself both in the operative control area as well as for the coupling of automation with the IT environment.

Druckhaus Spandau from Axel Springer Verlag
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