



The Lägerdorf plant near Hamburg is the germ cell from which the integration solution will be migrated.

Unlimited Flow of Data

Merging an I&C Planning Tool with a Process Control System

A. Geipel-Kern, Germany

Creating the control software at the touch of a button after engineering – and now the engineering specialists of cement manufacturer Holcim have turned this dream of all process control technicians and process engineers into reality. The pilot project has been completed: now the department is working on migration across the entire plant.

Automation is a subject that divides opinions. Some are so irritated by it they reject the whole concept, while others offer enthusiastic visions of transparent production, limitless data flows and access to the worldwide production network. Karsten Becker, head of Corporate Engineering and System Planning at the Lägerdorf plant of Holcim (Deutschland) AG, belongs unambiguously to the enthusiasts. Together with Martin Wiczorek, who heads up the Electrical Planning group in Lägerdorf, he is working on a truly ambitious project. The aim is to pull down the barriers between process control technology and electrical engineering and allow-

ing data to flow unhindered in both directions. The integration solution between the Engineering Base tool and the Siemens PCS 7 process control system allows all the hardware planning to be transferred to the PCS 7 by means of an export function, with the control software being generated at the touch of a button. But Becker and Wiczorek are already thinking several steps ahead: networking the planning tool with a geoinformation and a document management system to enable access to knowledge from anywhere in the plant.

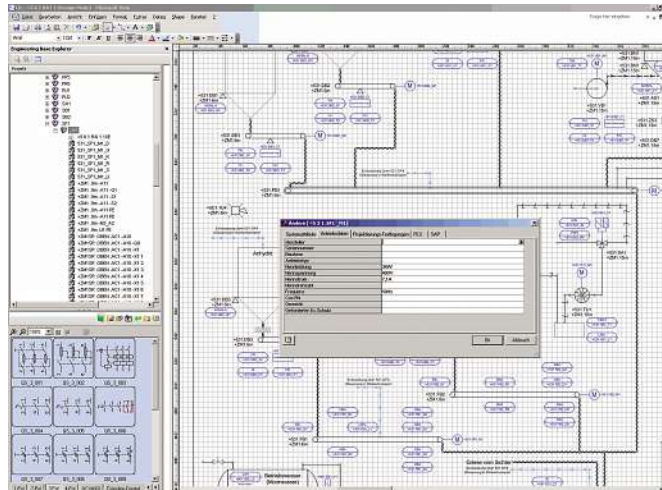
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You've got to be fast to win

The engineering department in Lägerdorf, Germany, is where the threads for system planning, construction, optimization, maintenance and dismantling all come together. It's a key role, because the cement business is extremely price-driven and the parent company, Holcim, based in Rapperswil-Jona, Switzerland, wants to defend a leading market position. Even the Lägerdorf plant, which produces 4300 tonnes of cement every day, is subject to market forces. "We can optimize the technology, but at the end of the day it is the market that determines the price and determines whether a company can or cannot exist", Becker states. What this basically means is that production facilities must be of a high technical standard, because shutdowns cost an enormous amount of money. "And that's why we need technically good tools", the engineering boss explains. What the tooling has to guarantee is quickly outlined: unhindered data from the project idea to the finished structure and, with it, the certainty that every employee, whether hardware planner, process engineer, process control technician or plant operator, can access the same data stock.

The End of the Excel List

The department has been gaining experience in the use of Engineering Base, a database-driven project planning tool, since last year, and with its predecessor, Aucoplan (also from Aucotec), for a great deal longer. At Holcim the software maps the entire workflow in the planning of an electrical engineering installation: in the first step, the piping and instrumentation flow chart as the basis, the dimensioning data and the I&C points, and in the second step the software engineering with the interface to the process control system. "In Engineering Base we are creating all the hardware plans for the system electronics, defining the locations, the structures of the control cabinets and their wiring", Wiczorek adds. The work has been made substantially easier by predefined worksheets for parts lists, order lists, wiring lists, etc. These allow changes to be transmitted to the database the very same minute, eliminating the need to accumulate Excel lists. Project texts are laid down in dictionaries, ensuring that terms are always used consistently. At Holcim the dictionaries are in four languages, enabling international teams to work with Engineering Base in the future.



The consistency of the engineering system means that everyone involved in the project has access at all times to the entire data stock, so he can see the same screen as his colleagues.

Holcim has a uniform, group-wide coding system, standardized across location and functional structures and known as the HACode, for illustrating the components of the flow chart. Whether a motor, sensor or cable harness, the HACode gives every employee of the 70 group companies world wide, the means to understand and interpret process engineering flow charts. The standardization is also an ideal basis for a highly standardized tool such as Engineering Base. Once the HACodes have been stored in the database, flow charts can be modified or new flow charts created by drag & drop.

To keep support costs low, the team tried to rely on the standards implemented

in the tool. But that was not always possible. "The shapes have been programmed for us", reports Wiczorek. The same applies for the folder hierarchy, which was modified so that "we are able to locate documents using our HACode structure."

Standardization is also the key to keeping the costs for creating the typicals low. After all, if the software for system visualization and control is to be created later in PCS 7, all typicals must be imported into the control system from Engineering Base. And creating the typicals is not something that can be done in ten minutes. Errors have to be eliminated, as they are duplicated when the typicals are copied. But Wiczorek reckons the expense is

Database-driven and Object-oriented

The Software at a Glance

Engineering Base (EB) is a product of the most recent generation of authoring systems for planning and documenting electrical and process engineering systems. The system works with a database in the background and maps the complete plant model in its hierarchical structure. Graphic and alphanumeric processing are given equal weight. Devices can, for instance, be copied across project boundaries in the alphanumeric tree structure by drag & drop. Equally, they can be placed on graphic plans by drag & drop. All representations of an object are permanently and consistently linked together. This ensures that all cross-references in the documents are always kept up-to-date, so that the user simply navigates from

one representation to another. EB uses Microsoft Office Visio for graphical representation. EB contains an extensive library of more than 2000 master shapes conforming to internationally accepted and other national standards. Devices that are stored in the virtual plant model 'know' which symbols are suitable for their representation, which makes creating the graphic documentation considerably easier. As well as the graphic documents, up-to-date lists of the devices used can also be displayed at any time. This list view, too, is useful for active processing and can be filtered and sorted by any criteria. It takes only a few mouse clicks to generate print outputs or files in Excel format from the list view.

In Interview

Flexibility by Design

The integration of Engineering Base and PCS7 has been achieved with and for Holcim customers, but it is still a standard solution. This guarantees constant refinement, emphasizes Olaf Streit, Sales Director Automation at Aucotec.



? *Mr. Streit, what role did the cement center of excellence play in the Holcim project?*

STREIT: In the center of excellence Siemens works closely with cement manufacturers on standardizing the software components within the PCS 7. Holcim is a driving force behind this and helped to create many of these standards. To that extent it was an ideal starting point.

? *How can you guarantee the adaptability of the solution in the fast-changing IT world?*

STREIT: Flexibility was one of the most important design criteria. Nevertheless, Holcim and Aucotec had different ideas of what that meant. Holcim wanted a fast solution that is also fit for the future. As the manufacturer, though, we didn't want a solution for just one customer, but rather an industry solution that will sell and has viability on the market. Only those solutions can expect to be constantly maintained and refined in the long term.

? *What does that mean in concrete terms?*

STREIT: We are relying on a technology that PCS 7 has been supporting for years, known as the import/export wizard. It is based on an Excel-like intermediate format that we are supporting in terms of Engineering Base. To put it simply, we have inserted a configurator between PCS 7 and EB that guarantees language and version independence and can take the customer's requirements into consideration. That's why we don't need programmers to make modifications. This solution enables us to configure the interface with PCS 7 according to the customer's needs.

worth it. "If a typical is used 15 times in a single project, the time saved easily adds up to a few hours."

Integrated Programming

Even creating the functional description for the system is done in the engineering tool. "All the necessary information is created here, including the folder hierarchy, image hierarchy, i.e. all the information that is normally held in the PCS 7", Wiczorek goes on. This reduces errors and subsequent expensive programming work in the process control system and saves weeks of time. The advantage is obvious: the programmer works directly in EB, and thus with the same data stock as the process engineer. "At the end of the project, before the FAT is carried out, all the planning is transferred to the PLT. This is where all hierarchies, groups and images are then linked to the data. At the end, the programmer just creates the cross-group functionalities in the process." The proce-

cedure that Wiczorek describes sounds simple, and in principle it is. That's because Aucotec has developed an import/export wizard for the porting that selects the right components from the standard ones created in Engineering Base.

Standardization is a dominant topic throughout the cement industry, and Holcim is working on it together with Siemens in the latter's cement center of excellence. "If there is one reason why the solution at Holcim worked so well and so quickly, it is CEMAT, which has become a de facto standard for the cement industry", explains Sales Director Process Automation Olaf Streit, the project manager at Aucotec.

Projects on the scale of Lägerdorf always have several levels. In addition to the doubtless important technical level, there is also a human dimension. After all, the integration has very considerable implications for working practices. "In an integration project it is important to bring the employees and colleagues with you", Wiczorek emphasizes. There were of course objections beforehand, Becker concedes.

But even in the preparatory training it became clear that the simplicity of the system and the benefits of data consistency rapidly won people round. The Windows interface in particular, which everyone is familiar with, makes using the system intuitive and facilitates access.

To be continued ...

The team completed the cement kiln I pilot project in January this year and, with the board having given the go-ahead for the next project, work on the kiln II project is now in full swing. It's a decision that shows how much confidence is placed in the tool and the integration solution. "For us, the kiln is the heart of production. If it's not running, we have a huge problem", Becker emphasizes.

Wiczorek reckons the work ahead of them, the scale of which makes the pilot project seem like a thesis compared with a 400-page book, will take a year. Over this time the four-strong project team will record 4000 objects – all the functional parts of the kiln (including drives, valves and measuring points) – and turn them into flow charts and functional descriptions. For Becker, the key benefit of the solution is the time saving when it comes to commissioning the system, as he measures the success of projects by their length. "This is the stage where any mistakes come to light." The integration solution could deliver a 35 per cent increase in speed, he estimates, and he also refers to the ability to handle faults faster. "We used to change the wiring and hope for the best, but we don't need to do that now."

But the end of the project is still a long way off. The aim, says Becker, is to convert the whole plant to PCS 7 V7.1 in four years and to hold all documentation and information in Engineering Base. "We'll then have a consistent data stock for the whole plant." And if Becker manages to get the automation spark to jump to the rest of the Holcim world, other plants may get on board soon as well. ■

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