Infopaper

AUCOTEC
Create Synergy – Connect Processes

iStock.com/robwilson39

Flexible use of centralized knowledge

Engineering data as the source of various processes for Industry 4.0

Everyone is talking about Industry 4.0 - including us! More and more companies are recognizing that they not only have to deal with the opportunities, but also the challenges that are involved with Industry 4.0. However, many designers see ample need for clarification in relation to this issue.

As a rule, only really consistent, networked engineering with minimal system disruptions will be able to meet future requirements. Holistic, digital machine and plant models, which provide cross-system, interdisciplinary data throughout the entire life cycle, are essential. Furthermore, engineering must provide solutions for tasks that are closely linked with Industry 4.0, for example, the customization of products and production ("Lot Size 1") under mass production conditions, networked production processes with central monitoring and handling amounts of data that can no longer be managed manually ("big data"). This data results from communication between machines and products or IT applications such as predictive maintenance, among other things. What impact does this have on engineering?

Lot Size 1

Lot Size 1 has long been an issue for engineering. No two plants are identical in plant engineering. Of course, their designers also claim to produce these customized "products" as efficiently as possible, thus according to the principle of mass production. The same applies to mechanical engineers. They want and have to meet individual customer requirements, but with as much standardization as possible. The need to do so is all the greater the more Industry 4.0 is incorporated in the plants. This is because the fourth industrial revolution is also revolutionizing plant complexity. Sophisticated modularity and practical modular systems that can be managed efficiently are required to cope with the complexity.

For the Engineering Base (EB) platform, AUCOTEC has developed solutions with which the virtually unlimited component diversity of plants as well as all variants of the maximum equipment of a machine (entire design space approach) can be easily compiled. Customized products are created consistently and quickly with Lot Size 1. Function-based templates ("typicals") that can be re-used continuously constitute the efficiency-generating aspect of standardization. The number of templates is reduced by a unique, centrally managed variant and option management, even in terms of Industry 4.0.

Better due to experience

EB is the only system that was developed on the basis of decades of experience both in plant and mechanical engineering, and thus also offers complete workflow coverage across disciplines, which is integrative from the initial plant concept to the last terminal. The growing number of mechanical engineers who are now relying increasingly on turnkey offers can benefit in particular from EB's versatility.

Working in a centralized networked manner

Each engineering work stage of each user is stored in EB's central database and is thus displayed immediately in all documentation views such as Explorer, graphics or tables. Manual revisions, multiple inputs and thus multiple sources of error are eliminated. The data model is a decisive advantage for changes in particular as they are edited centrally at one point, but are visible immediately in each of the often multiple representations of an object. Thus a distributed, networked method of working - an important aspect of Industry 4.0 - remains consistent and clear. All users involved can always see the up-to-date status of a plant, and this applies regardless of where and how a user accesses the system because it is also possible to work with EB via its Web Communication Server (WCS).

"The oil of the 21st century"

Editorial

Dear readers,

When "Industry 4.0" was presented for the first time five years ago at the Hannover Messe (Hannover Trade Fair), various aspects of it were already part of everyday life for some of our customers. "Big data", for example, in process engineering, and the automotive industry had long been familiar with the individual wiring harness in mass production. However, the speed with which this issue is now penetrating other industries is nevertheless impressive.

We also feel it. The significant growth of AUCOTEC AG in the last six years is linked directly to this development. All our major customers opted for the Engineering Base (EB) platform because central management of engineering data is at least as important for them as the CAE functions. We address both requirements. Since EB's market launch, AUCOTEC postulates in all major projects the combination of product and process innovation, which EB enables with enormous synergy effects.

Data is the oil of the 21st century, and we know how this is handled in engineering. Particularly impressive proof of this is a productive predictive maintenance project which enables the customer to make high reductions in costs and offer new innovative business models.

This customer verifies the fact as follows: "Engineering Base is perfect for Industry 4.0!" You are also very welcome to work with us to start this revolution within your company!

**Yours faithfully,
Markus Bochynek
Executive Officer**

We are looking forward to meeting you!

HANNOVER MESSE

Hanover,
25 - 29th April, 2016
Hall 6 / Stand K 17

Further topics:

No limits for "big data"

The vast amounts of data resulting not only from the plant complexity, but also from communicating machines and products or from status analyses for optimized maintenance are regarded as another "hallmark" of Industry 4.0. EB's answer to this is, on the one hand, an architecture with a database that is infinitely expandable in principle and also permits purely tabular work and, on the other hand, an openness that can embed not only your own engineering data, but also heterogeneous information connected to the engineering or can provide it via hyperlink. The philosophy of the system deliberately goes beyond the simple archiving of data. EB does not impose any limits on big data!

Key position

Thus the platform provides universal efficiency which takes into account more aspects of the life cycle of machines and plants than conventional CAE systems. EB can thus assume a key position for plant designers and operators in the overall context in the age of Industry 4.0. As the origin of all plant data and also as the source for downstream processes (such as predictive maintenance, see page 3), investing in data quality pays off in several respects. Whoever is progressing towards Industry 4.0 cannot avoid a database-driven, networked method of working - and thus cannot avoid Engineering Base!

SAP connection for more than 20 years
From the first certified CAD interface to most modern big data application

It is now 20 years since AUCOTEC launched the first certified SAP CAD online interface on the market. All essential functions were already available in 1996: from the importing and addition of material master data to Aucotec's former high-end system ELCAD via updates of attributes, for example, price updates, to BOM transfer in both the design and operating phases.

"Unique depth"

There has been a number of further developments in the meantime, including a very close connection of SAP to the database-driven platform Engineering Base (EB).
Bernd Höpner, Head of Development of AUCOTEC's customer Böwe Systec during EB's introduction, spoke about the "unique depth" of integration after the implementation of the solution. The user no longer sees that he is leaving "his" system. Thus switching systems and changing to another software as well as annoying logon processes are things of the past for him. "The largely automated creation of BOMs and checking

of documents directly from EB not only saves time, but also increases the quality of our stored documents," said Höpner at the time.

"Integrated solutions"

As a "single source of truth", EB now also "feeds" SAP's predictive maintenance application based on HANA with engineering knowledge to enable vast amounts of status data of an operating plant to be interpreted correctly at any time without unnecessary additional work, and thus allow a useful analysis. (See page 3)

"The innovative solutions from SAP, which also play an important role in the implementation of the Industry 4.0-related issues "Industrial Internet of Things" (IIoT) and big data, are widely used by our customers. Our integration experts will continue to ensure that AUCOTEC's synergy concept is also implemented for ERP in terms of integrated cross-process solutions with SAP," says Product Manager Norbert Ott.

From diagrams to data
AUCOTEC Technology Day allows plant engineering experts to benefit from practical solutions

Plant engineers in particular, who are facing very complex challenges, came to Hanover at the end of 2015 to attend AUCOTEC AG's fourth Technology Day. The companies Claudius Peters, Rippert, and IKN presented clear examples of the synergies which resulted from changing their engineering processes to database-driven design.

The speakers agreed that the approach that has emerged with the software platform Engineering Base (EB) requires rethinking, but saves a significant amount of time and produces documentation of a significantly higher quality. Reinhard Knapp, Senior Product Manager at AUCOTEC, explains it thus: "EB moves engineering from the diagrams to the data. Instead of being document-centric as in the past, the data itself is now the main focus, including its links."

Database instead of data islands

Ulrich Cord, Group Manager of Automation Engineering at the bulk material and process engineering specialists Claudius Peters in Buxtehude, explains: "We wanted to get away from the paper processes of the document world. The change which was initiated by EB is already a success story for us." EB has built interdisciplinary bridges. "Our expectation has been met fully in terms of eliminating the impediments to the workflow caused by the previous data islands from different tools," says Cord.

"All information consolidated"

IKN, experts in pyro line issues for cement clinker production, required significantly more modern software for its increasingly complex projects. "EB's data model was preaching to the converted where we were concerned, and we have internalized that very quickly," says Technical Director Jörg Hammerich. He highlights the transparency which major IKN projects now possess: "All critical information about the plant sections is consolidated in EB."

Consistency as a common thread

The surface treatment company Rippert designs its plants according to the internationally binding standard IEC 81346. "The option of function-oriented assembly formation and the accompanying standardization are EB's major advantages," explains the Administrator Thomas Möller. However, the deciding factor for EB was its future viability and the consistency of projects from the process engineering flow diagram to control technology. "Only EB was able to fulfil this requirement," says Möller.

The topic of "real" consistency was like a common thread which ran through the presentations and discussions of the guests. All guests saw it as a decisive advantage that it is no longer necessary to search for data via interfaces and file boundaries,

> **Presentation Ulrich Cord, Claudius Peters**

but to have instead consistent mapping and monitoring of projects from the initial idea via the tender up to maintenance.

"'It's not possible' is no longer possible"

The audience identified with the "surprisingly open" ideas during the presented challenges. One of the guests thus concluded: "'It's not possible' is no longer possible as EB can fulfil even strange customer requirements."

> **From left to right: Thomas Möller (Rippert), Ulrich Cord (Claudius Peters), Jörg Hammerich (IKN)**

Predictive maintenance – not clairvoyance but clarity!

Close connection of engineering to PdM reduces time and errors

Predictive maintenance (PdM) systems are big data applications that calculate optimized maintenance intervals from the analysis of the huge amounts of live plant data sent continually by the control system or identify a breakdown in advance. Unexpected breakdowns should be reduced by about 70% as a result.

"Feeding" big data manually?

The correct interpretation of the status data is required for the analysis. For this purpose, the PdM system must first understand, however, that the value x to signal y indicates, for example, a certain pressure on a certain sensor and not a temperature. AUCOTEC's solution enables the system to obtain this knowledge directly from the Engineering Base (EB) platform. Such information previously had to be read manually into the

PdM or via various interfaces and lists that had to be compiled laboriously. This signifies a mammoth task for often 50,000 or more control system signals, even without the usual plant changes in operation.

Single source of truth

The close connection to the PdM is only possible because EB can represent abstract objects, e.g. measurement types such as bar or Celsius, which are classified under a sensor. Such information cannot be mapped without the database-driven platform because it is not included in circuit diagrams or P&IDs.

EB is not only the "single source of truth" of all technical plant data, but also its transfer characteristic. This can be used simultaneously for the configuration of the control system and

the PdM. Thus the PdM can always clearly interpret live data without any additional work involved.

50% reduction in maintenance costs

EB's PdM connection is already used by a large, globally operating machine manufacturer, which offers global maintenance of its customers' plants. It expects a reduction of about 50% in its maintenance costs.

"EB's PdM support shows that predictive maintenance is not rocket science, but an efficient practice already implemented along the path to Industry 4.0", explains Executive Officer of AUCOTEC Markus Bochynek. He believes: "The more complex the engineering tasks, the more comprehensively EB works!"

Watch the film about the PDM connection of EB

"Its open system is by design"

SAP integration expert from ILC speaks about system zoos, openness and the growing volume of master data

Michael Gräfe (46) has been advising and assisting industrial customers in the optimization of product development processes, especially in the SAP environment, for over 20 years. As Solution Manager at ILC GmbH, he is responsible for the integration of engineering systems such as Aucotec's Engineering Base in the SAP environment.

ILC is a specialist in integrated product-development processes - what does this mean?

> Michael Gräfe   For us, the term "integration" has several aspects: firstly, the interconnection of various partial processes in product development, for example, the interaction of modification processes with the resulting master data generation processes. Secondly, the integration of data, for example, the interconnecting relationships between an engineering BOM and the production or assembly BOMs and, thirdly, the technological integration of applications and systems. The holistic view of product development, which continues to be very fragmented in the aforementioned aspects, is ultimately important to us.
A major challenge for information technology in this context is to provide at the right time to each employee in the company the exact information required for the completion of his task.

You readily refer to a real "zoo" of systems which do not interact or only slightly. Can you give us an example of a really big zoo?

In every company without exception, we find a variety of usually non-integrated applications which the user requires to complete his tasks. Let me give you an example of a typical design workplace. The designer is confronted with systems for the requirement definition, project management, QM systems (FMEA, etc.), CAD systems, ERP systems and, last but not least, with Excel, PowerPoint, Word, etc. This list is just the tip of the

iceberg in our experience. The designer repeatedly enters similar or identical information in these applications since there is no integration. This is prone to errors and ties up a substantial amount of resources. The designer is increasingly becoming an administrator and can no longer sufficiently fulfil his actual task of designing.

And what are the most common cases in your integration work?

Ultimately, no component can be ordered or manufactured if its relevant data is not eventually available in SAP. Our work mainly involves performing the transfer of design data to the production planning and production control processes in SAP so that the correct data is available there promptly, consistently, and completely.

On your website, you highlight in particular, among others, your work with SAP Business Suite. Why?

SAP Business Suite is by far the leading ERP system worldwide. We have made it our business to ensure that the product development processes of our customers are perfectly matched to the ERP system of the global market leader. Thus we generate major benefits for our customers.

You assisted in the linking of SAP and Engineering Base during a major project for AUCOTEC in Austria. How was that?

The collaboration with AUCOTEC's employees worked perfectly. The work environment was very open. That fact and the very competent AUCOTEC project team contributed decisively to the success of the project. And most importantly, the client's users are completely satisfied with the solution!

What was different with Engineering Base (EB) and why?

Undoubtedly, its open system is by design, not only in the aforementioned collaboration, but also in the software. This is because EB's open architecture and modern interface concepts have enabled us to implement clear and and easy-to-use dialogs for the user to synchronize data between both EB and

SAP. The excellent technological basis of both systems also made it easy for us to implement and operate the integration within a short time. Unfortunately, this is not always the case with systems to be integrated.

Change management is a core issue. ILC has just established a DACH-wide working group for this purpose. How do you rate EB in this respect?

The issue of change management is hugely important for our customers because it entails very high potential for cost savings. We established the working group at the request of our customers because we often discuss the same issues again and again with our customers. We are hoping to achieve a certain degree of standardization for this highly complex issue as a result of the activities of the working group.
The integration of third-party systems such as EB is thus a recurring issue. We think that it is absolutely necessary to integrate the important third-party systems in the change process.

For whom is integration of particular interest in your experience?

The integration of Engineering Base and SAP is of particular interest for customers who want to display and compare a lot of master data such as material masters, BOMs, project data or documents from EB in SAP. In our experience, the volume of master data rises sharply with increasing product complexity and variant diversity. Thus integration is now useful for virtually every company that uses SAP systems. It can significantly reduce the work involved and errors. The data quality and consistency are significantly improved on the other side, which ultimately leads to greater efficiency in order processing procedures.

Thank you very much for this interview, Mr Gräfe!

In the interview

Perfect separation more rapidly
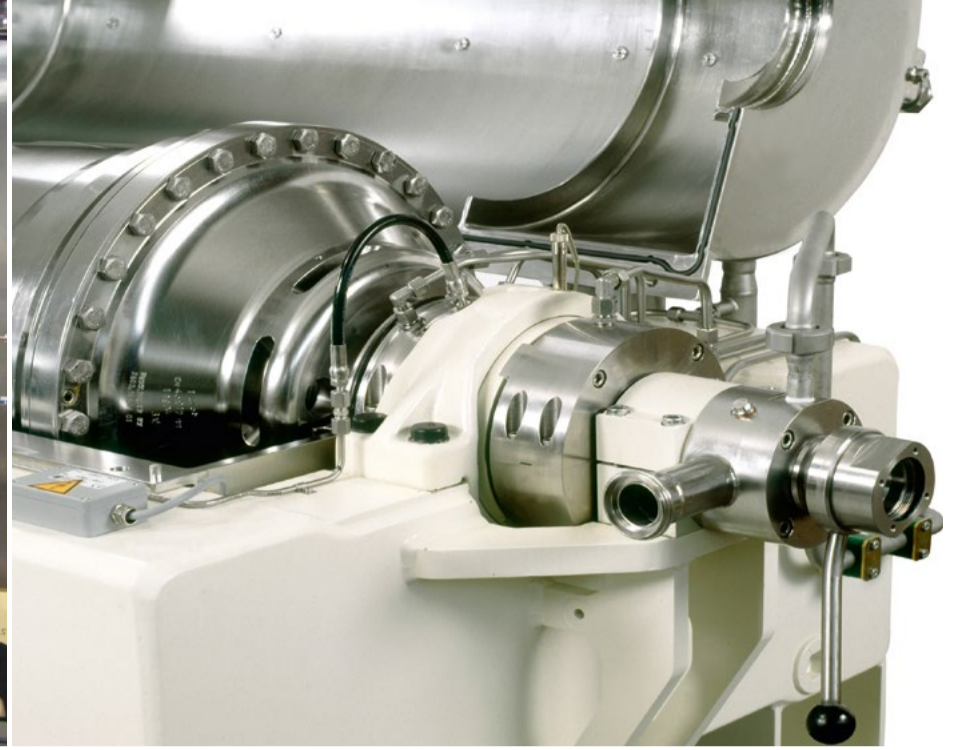
Flottweg Separation Technology saves up to 75% per project with EB

Flottweg is one of the world's leading suppliers of plants for clarifying and separating liquids as well as for concentrating and dewatering. With its passion for perfection, Flottweg has produced long-lasting, high-performance industrial centrifuges and belt presses for over 60 years. After more than 40 years on the U.S. and Canadian markets, the Germany-based company opened its U.S. head office in Kentucky in 2008. The 100% subsidiary maintains five sales offices in the U.S. It uses Engineering Base (EB) for its design planning.

Before: manual work and data loss
Flottweg projects often require a customized electrical design. "We have long used a highly drawing-oriented tool for our projects. Due to discrepancies in our BOMs, field wire terminal reports, and the incorrect updating of parts on our diagram, troubleshooting took enormous amounts of time," reports Jake York, Senior Electrical & Controls Engineer in Flottweg's U.S. head office. The wiring information was manually entered due to the unreliable data. Engineers had to allow for regular program crashes, loss of data, and restarts when revising even minor parts of the project.

After: automatically accurate
Jake York knew that he needed a significantly better engineering solution. However, his first encounter with the software platform EB left him hesitating initially because of the presumed work and time it would take to convert to a different software. Nevertheless, the flexibility, ease of use and structure of EB rapidly convinced the Department Head and his team that the investment would be worthwhile.

Due to its database, EB automatically and accurately updates all related project views during revisions, regardless of whether the change was made in a table, graphic, or Explorer. "In EB, reports are live data in these tables called worksheets, thus we avoid having to create the report completely. The fact that updates are performed correctly and automatically without any additional work was the deciding factor for our decision," says York. "Since the conversion, we design our projects with ease at Flottweg."

From 8 to 2 hours
The catalogue was filled with standard Flottweg components that were linked to master shapes. As a result, components can now be simply replaced via drag & drop. "Projects that used to take us 8-12 hours now take us only 2-6 hours with EB, which is a 50-75% saving of time," says Jake York.

Generally perfect for general contractors

EB's versatility accelerates TBP processes significantly

The family business TBP Group, based in Linz, Austria, developed as an engineering service provider for 65 years (initially in the paper and pulp industry). Today, their now over 100 employees worldwide also support major projects in the energy sector or the starch and sugar industry. As a general contractor, TBP is thereby responsible for the complete engineering of a plant. This includes process design, procurement, plant design, piping, I&C design engineering and automation as well as calculations.

"Very easily solvable"
The company, which attaches importance to the maximum efficiency of its processes, had become aware of Engineering Base (EB) as a result of an order from Südzucker. Meanwhile, TBP also uses the system in other projects. "EB's flexibility is ideal for the very different requirements of our customers," says Thomas Hennerbichler, I&C Design and Automation project engineer at TBP.

For a new starch plant at the Südzucker site in Zeitz, TBP had to integrate the data from over 10 different suppliers in the entire plant. "This was a real challenge, but was very easily solvable due to predefined data exchange lists and the intelligent import ability of EB," says Hennerbichler. The cooperation of AUCOTEC and TBP for customizing also gave rise to completely new EB functions:

More overview and smarter pipes
Thus, for example, Advanced Data Tracking was added to EB for a specific project overview. This customizable change tracking significantly reduces the flood of data, avoids errors and improves the quality of the data. "This greatly facilitated data exchange is a huge advantage," says Thomas Hennerbichler.

The intelligent structure and segmentation of piping were created jointly. Thus, you can add information about flow direction, media and similar to each line display. Automated target tracking shows the topology of all sub-segments.

"Really consistent"
"With EB, we have received really consistent documentation for the starch plant, from the block flow diagram to the complete I&C design engineering," reports the engineering professional. All disciplines work with the same database. This consistency greatly accelerates engineering. The predefined tags and loads only had to be copied from the database. It was also particularly easy to generate bills of material (BOMs) and layout diagrams with one data source in one tool. Hennerbichler's conclusion: "EB's versatility is perfect for viewing the overall design."