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Tearing down walls!

First versatile data model enables non-stop plant engineering from FEED to operation

Plant engineering is characterized by a variety of engineering and management tasks that take months, and sometimes years. Each individual task is demanding in itself. Since the various disciplines involved are often developed globally, however, it is also necessary to connect hundreds of experts, from different time zones, with their different skills, languages, technologies and engineering cultures. Even the development tools are often different. AUCOTEC thus relies on cooperative parallelism of all core disciplines from FEED to automation and operation.

Inherently cooperative

This is what AUCOTEC's cooperative platform Engineering Base (EB) has signified for over 15 years as it was designed from the outset for multi-user capability and parallelization of the relevant processes. "We see great demand in the market to tear down the walls created by toolchains. Only real parallelization of the

core tasks creates effective leaps in efficiency despite increasing complexity," said Management Board member Uwe Vogt. AUCOTEC, which has operated successfully for over 30 years with engineering software for mechanical and plant engineering, has been continuously driving the expansion of EB since its introduction.

"We have reached the point where we can say 'Mission completed!'. With the new version 2018, EB's versatile data model offers a range of disciplines and thus collaboration capability and consistency that are globally unique," said Vogt. Thus EB restructures the workflow in plant engineering as its principle of simultaneous engineering eliminates unnecessary waiting for data transfers, highly complex cross-checks, discussions or synchronization. "This is the only way in which cooperation can be highly efficient and consistent," stressed Vogt.

The limits of the toolchain

"Even the best interfaces and synchronization platforms with the most modern transfer standards do not shorten a toolchain. The chain itself is the obstacle because the 'forwarding' of information across system boundaries takes time, is always a source of error and prevents parallelization. This increases exponentially with each chain link and each connection," explained Pouria G. Bigvand, Head of Product Management at AUCOTEC.

In a toolchain, for example, it is necessary to specifically ensure that the device designations are the same in all disciplines because synchronization is not possible otherwise. In addition, inconsistencies result from different formats, standards, languages or engineering methods of the individual specific tools for which a synchronization platform cannot even compensate. "This means that

losses in quality and time are literally pre-programmed. And the more complex the range of tools, the greater the risks," claimed Bigvand.

Unity for diversity

Thus he emphasized: "The challenges in plant engineering clearly show that only unity can cope with diversity." This is ensured by EB's unique, versatile data model. All core disciplines, starting with basic engineering with FEED up to the cause & effect check before commissioning, jointly use it in parallel and even simultaneously. For their specifications, they can directly develop the information that colleagues from other departments have just created because they see it immediately, without data transfers and interfaces or synchronization runs.

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"Motorization of engineering"

Dear readers,

ACHEMA 2018 is finally here, and thus also Engineering Base 2018 (EB). We have been working so hard for it and on it over the last few months and years that we could hardly wait for this product launch.

Although it is "only" a new version of our collaborative platform EB, it is the biggest step since its introduction a good fifteen years ago. The most comprehensive extensions were made in the areas of front-end engineering design (FEED) and process design. Thus EB's versatile data model now has a unique range. Furthermore, EB responds to challenges,

such as parallel work in different teams with dynamic changes, with its ability to also make all resulting consequences transparent.

In addition to plant engineers, EB also supports operators on their path to the future. This is because it is only with a complete digital data model which is accessible from anywhere that topics such as predictive maintenance and asset performance optimization can be usefully implemented.

Consistency and efficiency have been reconceived in EB 2018. Thus you can "motorize" your engineering, instead of just speeding it up with more horsepower. Avail of this huge

competitive advantage! We look forward to discussing it with you at ACHEMA or at another location of your choice.

**Yours faithfully,
Uwe Vogt
Executive Officer**



ACHEMA 2018



We are looking forward to meeting you!

Frankfurt
11th - 15th June, 2018
Hall 9.2 / Stand B 12

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The integration of systems such as simulation, ERP or 3-D is also much easier if unity is their basis. A web connection for Cloud and app engineering also facilitates worldwide collaboration as well as maintenance tasks and makes them more flexible.

Advanced change management (execution management)

The uniform data model of the plant also means significantly more efficiency in the event of changes. With EB, each change in each discipline directly affects, if desired, all representations of the changed object, whether in graph-

ics, a table or Explorer, and is visible to all areas. "However, the parallel editing of the model by different experts and areas requires advanced change management," emphasized product manager Bigvand. According to him, the platform meets this requirement with a whole host of functions, including, a detailed, individually configurable history log for each individual object as well as particularly transparent revision and version management. Furthermore, EB provides proposal fields for attributes, thus enabling change requests to be checked before being implemented.

New level of efficiency

"The continuity and consistency of this solution result in a completely new level of efficiency, while also ensuring that it is future-proof in terms of Smart Factory and Industry 4.0. The combination of task parallelization, central data and openness for complementary tools will be the standard for this from now on," summarized Uwe Vogt. "We didn't want to speed up an old 'carriage' with more horsepower. Instead, our goal was to 'motorize' plant engineering. We are convinced that we have achieved this," said the Executive Officer.

Optimum consistency already achieved:

non-stop from FEED to automation

Simulation feeds FEED

With the latest version Engineering Base 2018 (EB), the collaboration platform redefines the term "consistency" for plant engineering. All core disciplines are now integrated into one versatile data model. The seamlessly consistent development process already starts with the FEED phase (front-end engineering design). It initially benefits from EB's openness and automatically imports the results from the simulation, for example, with AspenTech or Etap. EB immediately shows all consequences of a particular scenario from the flow diagram to the material balance – automatically and in each individual document. Due to this enormous acceleration of scenario development, plant designers have the opportunity to examine significantly more scenarios and to provide the absolutely optimum plant configuration as a result. Previously, time and resources were often only sufficient for a maximum of 2 or 3 different plant versions, without any assurance of having found the optimum.



"From the outset, EB has had this versatile data model in which objects are linked to each other and to their graphic representations. Our developers have added a whole new dimension with the different scenarios. I think this is brilliant - it shows that this model knows no limits!"

> Reinhard Knapp, Head of Global Strategies

Experience in detail

Circuit diagram design, wiring, terminal assignment, cabinet design, I/O specifications, in short: the entire range of designs for the energy supply of engines, pumps, valves, sensors and everything else which makes a plant operational has been a core area of AUCOTEC's software systems for over 30 years. Due to its skills in this area, the company was already operating in the market in the early stages of CAD and has grown considerably since then.



"Our intensive experience in detail engineering has led to particularly practical functions in EB 2018. It is important to us that solutions not only look good on paper. We know here that they are very well received by users – especially in the international market."

> Norbert Ott, Product Manager

Cause and effect: central means consistent

Prior to the initial start-up of operations, a plant is thoroughly tested using cause and effect documents. This phase once again benefits in particular from EB's versatile data model. Absolutely reliable C&E tables are the most important key here. Up to now, they have been created by compiling information from different sources of different disciplines, for example, from P&IDs, logic diagrams and other documents. Several highly qualified experts invest weeks of their time on this task each time. In contrast, EB extracts all necessary information from its central data source and automatically creates the report matrix. This ensures unprecedented consistency and saves valuable engineering capacity.



"We challenged ourselves to 'think outside the box'. The combination of a particularly open platform, a highly creative team as well as the courage and sense of fun to exceed limits allowed us to create a data model that offers completely new options."

> Arno Fahrenkamp, Solution Expert

Automating automatically: DCS portal

In order for distributed control systems to regulate the plant in a functional manner, they must know all the relevant parameters from the plant engineering. In order to significantly facilitate the complex configuration of these signals, usually thousands, which often takes weeks, EB 2018 offers a unique bridge to any automation system that is open to communication, even to several systems in parallel. With its distributed control system (DCS) portal, the specifications of the plant designers can be transferred automatically and directly to DCS programming. The distributed control system also instantly detects changes. This particularly accelerates the work of general contractors or operators who, due to their history, use different distributed control systems. They each use their own programming tools and software modules. EB's portal can provide an appropriate container for each system. The first containers for PCS 7 and ABB 800xA are already available.



"I have been involved in the integration of various distributed control systems for a long time. We have already implemented a number of customer-specific connections. With the DCS portal, however, we have achieved a highly flexible solution with an unprecedented openness which can expand to meet the requirements of our customers."

> Martin Imbusch, Product Manager

Short process

The process design then "only" has to add its specifications to the FEED scenario that was finally commissioned. The P&ID is the core of the collaboration of all disciplines involved, and its definitions are the starting point for all further elaborations. "One more reason to allow all areas to directly access this data," said Pouria Bigvand, Head of Product Management. EB accelerates the creation of the flow diagram, among other things, with a pipe-class-related workflow and rule-based engineering. This ensures, for example, the automatic adaptation of the entire equipment (which is assigned to a particular piping) to the specifications of the relevant pipe class, which is also available as TÜV-certified on request.



"The fact that, with Drafz Consulting, we have a competent partner at our side for the pipe class topic is a real bonus, also for EB. Their expertise and our new 'Find specification' feature complement each other perfectly and improve the specification-driven work enormously!"

> Leon Hanke, Solution Expert





When it's up and running ...

digital twin maintenance for operation and maintenance tasks

... the documentation of the original plant is often neglected because the service technicians are not familiar with the planning tool or because the integration of data from larger revampings is far too complicated. As a result, the expensive original planning quickly loses its value because the data that once represented the "digital twin" of the plant is no longer reliable (reported by Info Paper 1/2018). With its convenient maintenance functions that can be easily used and the highly consistent management of extensive revampings, AUCOTEC ensures that this value is retained through the up-to-dateness of the data.



"For us, a 'digital twin' is not only the physical 2-D or 3-D image of the plant. EB also captures its 'soul': from the concept ideas to cross-disciplinary linking of all relevant data of the operating plant, including logic, rules and automation configuration."

> Pouria Bigvand, Head of Product Management

Revamping made easy

EB's special execution management for larger revamping projects also works for sub-contractors and several assignment levels. In addition to the unique transparency with regard to the outsourced data and its convenient processing, the system ensures an orderly and

exceptionally consistent return of the new data to the overall documentation. This is because EB immediately transfers all consequences of changes (executions) to all disciplines of the new "as-is" status due to its versatile data model. Discrepancies are immediately visible. The changes are logged and are provided as navigational alerts.



"Over the years, we have held countless discussions on this topic with users from the most diverse industries. They have resulted in a generic solution that can be used anywhere. It has been a long road, but the result has justified all efforts. Especially when users confirm its uniqueness!"

> Martin Imbusch, Product Manager

Mobile and up-to-date with apps

On the one hand, EB 2018 offers web-based functions in various apps for the maintenance area. They enable maximum mobility for technicians, allow direct information from the plant to the engineering department, and provide the management with an overview of the status and progress of maintenance tasks. On the other hand, EB's proven maintenance tool also facilitates easy red entries offline, followed by their secure transfer to the design engineers.

"Data quality higher than before conversion"

IPRO Managing Director Seemann on data migration and Engineering Base



> Frank Seemann

IPRO Industrieprojekt GmbH, founded in 1963, is an independent engineering office for industrial plants of the food and chemical industry in particular. With its many years of market knowledge and the current commitment of about 70 employees in Germany and at its subsidiary IPRO India, the service provider has been offering engineering knowledge "Made in Germany" for more than 55 years: from feasibility studies via audits, basic and detail engineering to construction supervision and commissioning. The qualified engineer Frank Seemann (51) is Managing Director at IPRO.

How did you know AUCOTEC, Mr Seemann?

IPRO has been a customer for over 20 years. It started with a market analysis of electrical design packages. EPLAN and ELCAD were shortlisted. We opted for ELCAD and AUCOPLAN as AUCOTEC was the leader at the time with them.

You have just carried out an extensive migration project to Engineering Base for a leading global chemical plant operator. What did it entail?

It was special in that it was the first major project in which the data was not migrated to Engineering Base (EB) from another AUCOTEC system, but from that of another manufacturer, SmartPlant from Intergraph in this case. We were commissioned because the customer needed someone who was familiar with both systems. Our team used this expertise to develop an interface for the transfer. Initially, there was no plan for the data to be better than the original documentation, but we were able to clean and supplement

many data records with EB. Thus the data had a higher quality after the conversion than before it.

It was advantageous that EB is such an open system. We were able to easily work with our C# (.NET) programming for the interface we developed. These programs enabled over 20,000 loops to be created automatically in EB – including all information from the predecessor's instrumentation tool – and over 1,000 P&IDs were intelligently transferred and revised.

Why did the customer want to switch to EB?

He had taken over another operator's plants and found that the existing engineering system and the data did not meet his requirements. Furthermore, some of the previous owner's specific programs were no longer available to him. In addition, the previous system support was provided from the U.S. As a result, the P&ID tool and the instrumentation tool were not optimally used. Support is available in German for EB.

The decisive factor, however, was that EB's predecessor did not offer the type of data linking that the customer expected. He wanted direct access to all relevant documents in a central plant model, not individual applications connected via a bus system. The fact that P&IDs, circuit diagrams, loops and other documents can be managed in only one system tipped the scales in favour of EB. We, as plant designers, can now work directly and consistently with all engineering data in a cross-disciplinary manner for revamping projects, without a time-consuming back-and-forth process.

What is the next step now for the customer with EB?

Currently, the connection to SAP is a very specific issue. Furthermore, he rigorously invests energy in the extended use

of data and has also assembled an expert team for this purpose. It is directly supported by AUCOTEC as well as by external service providers like us. There are user training sessions, manuals are in progress and other licenses are planned in the medium term, whereby the customer himself usually only views data, while data entries are made by service providers.

In addition, the operator has established a user group in which he exchanges information with experienced EB users from the cement, food and chemical industries as well as with us about four times a year. The group also formulates common requests for the further development of EB. Thus it is also in close contact with AUCOTEC. They have a tradition there of being close to the customer and his practice, and this is sure to continuously promote the EB platform.

And what has been your experience as an EB user?

We really liked its open structure with the SQL Server in the background. We already had experience with other database-driven systems, mostly on Oracle. Familiarization with EB was very easy. We also knew about Visio from our special software "SUGARS". Thus EB fits perfectly into our 2-D/3-D CAE environment. We use our own EB licenses for the development of further programs and of course for in-house projects, here usually for cable management.

As a service provider, we work primarily in a Citrix environment on customers' systems. That seems to be our concept for the future. EB's data-centric approach makes it much easier to work directly on the customer database than with other systems.

Thank you very much for this interview, Mr Seemann!



Image: Solvay Rheinberg

Not your everyday products, but more than fit for everyday use!

Engineering Base standardizes system environment at Solvay in Rheinberg

From window glass to detergents and food-stuffs and from dialysis to flue gas cleaning: Solvay products are to be found in many areas of our everyday life. For many of the products manufactured at the Rheinberg plant, such as soda, Solvay is one of the European or world leaders. In addition to Solvay's 400 employees, around 600 employees work in sister and partner companies in Rheinberg Industrial Park.

Until recently, the Design department had used a multitude of tools for electrical engineering design. However, their maintenance, the consistent data management and the "forwarding" of data across system boundaries involved costs that were "simply not in keeping with the times" according

to Markus Terheiden, Project Engineer and Georg Lindbüchl, Group Manager of Energy Technology at Solvay.

Leading

A modern, uniform system was sought for the documentation of the entire electrical wiring of plants, from 25 kV up to IT. It should master all types of presentation: from circuit diagrams and detailed wiring diagrams to assignment tables, from fibre optic cables to communication cables. Upon comparison, Engineering Base (EB) from AUCOTEC proved to be a leader according to Lindbüchl. During this process, Solvay attached particular importance to viewing and redlining, convenient data administration, and an Excel interface that is easy to use.

"Live" data

"As an operator, we handle 'live' data on a daily basis, and we have to change, improve and develop diagrams. Thus the new system had to be able to adopt legacy data in a consistent manner," reported the Group Manager. With EB's migration solution, which configures, maps and imports the data, all object information was combined from different systems. In EB's central database, these objects form a comprehensive plant model with all logic links, which can be simultaneously edited by the participants.

Approval facilitated

"Our electrical engineering information is now integrated into EB. The areas are better networked, and data management is easier.

This is a clear plus for quality and time," said the Project Engineer Terheiden. According to him, it is also a plus for approval procedures. External data management enables the authorities to have access. Since it is fed by EB, there is a reliance on the up-to-dateness of the data. The usual additional data entries are no longer necessary.

Synergy

At Solvay, the system is now to be developed even further. Thus consideration is being given to covering the process area with EB in order to exploit further synergy effects of this special platform.

Single Source of Truth: pointing to the future

Hexion modernizes engineering with EB from AUCOTEC

Hexion, a world-leading specialist chemical company, has a long tradition of innovation, expertise and customised services. It developed one of the world's first plastics, Bakelite®, and the very first epoxy resins. With more than 4,300 employees at 60 locations globally, Hexion produces special chemicals and high-performance materials with its know-how and experience. Group headquarters is in Columbus, Ohio.

Investing in the future

As a builder and operator of industrial plant systems that manages the production of approximately 400 items, Duisburg (Germany)-based Hexion GmbH began using Engineering Base (EB) in 2016 as part of its EMR planning. One main reason for this choice was EB's data centralization. "We wanted to invest in the future rather than in a tried and tested legacy system. EB is increasingly our Single Source of Truth for all 'as-built' data. We see this as the only path to follow," explained Christian Marschner, Senior Project Engineer at Hexion.

As EB keeps all projects in a central database, the matching of items, which previously occurred repeatedly in various projects, can now be done in a moment. Centralization reduces errors and consultation costs, while keeping everyone permanently updated. "This saves a lot of time," said Mr Marschner.

Simple and convenient

Furthermore, EB was impressive due to its relatively straightforward deployment, its flexible management of user rights and the smooth integration of supplier data. "The ability to link externally generated data with equipment or functions is very useful, particularly when time is tight. EB tells you immediately, also via web service, what you need to know about an item," reported Nils Stellmacher, a key user of the application.

EB's worksheets are another plus point for him. "They allow us to implement even quite complex requests." Examples include the expansion of the establishment plan using

Ex-I-Typicals, where adjustments to the worksheet are also displayed directly as graphs and in Explorer. These lists are ideal for quickly resolving inconsistencies or errors and for providing efficient support for data migration.

Unleashing its full potential ...

EB will gradually be rolled out across the Group. More than 50% of projects in Duisburg are already available in EB. The composite materials plant for items as wind turbine blades or Formula 1 car body parts was designed in EB from the outset. "We took full advantage of the database structure," said the manager responsible. His team is currently working on using EB also for the future creation of P&IDs. As Christian Marschner concludes: "That's when we will see the platform unleash its full potential. There is still a lot to come!"



Image: Hexion

Many companies in the process industry have already opted for Engineering Base, for example:



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