



Image: iStock.com/luhanos

The only constant was change ...

Now, even the implementation of changes is constant – thanks to a single source of truth

Heraclitus of Ephesus already knew it over 2,500 years ago: “Nothing is as constant as change.” Today’s plant engineers, EPCs and suppliers can tell you more than a thing or two about it. Whether at the design stage, when commissioning or revamping an operating plant, or whether from suppliers or customers: changes are on the cards for certain. What is far from certain is the ability to consistently oversee and implement these changes throughout the entire documentation trail.

Risk of confusion, mistakes, omissions
“Subsequent changes are forgotten, the status is not identified correctly, revision statuses are confused, older versions are inadvertently imported or new statuses are not checked,” explained Reinhard Knapp, Senior Product Manager at AUCOTEC. The problem faced by many designers is the management of documents and design statuses in complicated file

systems which hinder consistency on the one hand, while, on the other hand, requiring the user to locate, open, and edit each individual file in which the changed object or its links occur.

Added to this are the requirements of modern simultaneous co-operative projects and engineering that meets Industry 4.0 standards. The complexity of plant design and operation has increased significantly in recent years. Projects are globally distributed, and often edited in parallel by multiple disciplines, and there is no end in sight to this development. A file system is not only cumbersome, but poses a real risk factor for the data quality and schedule.

Elimination of the search for duplicates and their maintenance
“This risk no longer exists with Engineering Base (EB),” said Knapp. “The mammoth task

involved in changes at all stages of the life cycle of a plant or machine was one of the reasons for developing this software platform which is based on the principle of the “single source of truth”. EB’s database-driven nature eliminates object duplicates, and thus lengthy searches for all object representations. Multiple entries and transmission errors are eliminated. All users work with the same data model. A change in the graphic, for example, is immediately visible in the relevant lists or in the Explorer. Of course, it is also visible everywhere the component occurs. This not only makes changing much faster, but also safer. You can stop worrying that you will forget something.

Furthermore, the usually high number of people using the system nowadays – from in-house discipline users to external suppliers and subcontractors – means that the managing of changes and their identification as well

as a secure information system are of particular importance.

Automatic comparing, tracking, adopting
For this purpose, AUCOTEC developed an overall concept which ranges from easy configurable data tracking for the perfect tabular project overview – also involving many subcontractors – via automated graphic revision up to detailed status tracking not only of objects, but also of individual attributes. This also includes smart worksheets whose data is entered by suppliers and is then automatically adopted and compared by EB. Changes are immediately visible. Initial pilot customers are already defining the workflow-based, subsequent processes that are to be triggered when transitioning from one status to the next. It is possible to filter specifically for different statuses. EB’s revision management automatically detects and identifies changes in graphic documents, while tooltips show the previous

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“Establishing new processes together”

Dear readers,

Squaring the circle, a universally specific solution, Lot Size 1 under serial conditions: do these concepts constitute a paradox? The latter concept at any rate is far less of a paradox than it sounds, as indicated by initial examples of Industry 4.0 applications. Would you also like to develop customized products at mass production costs? Or the plants for them? Are you also searching for the best recipe for this universally specific solution?

The challenge in this case has less to do with its technological aspect. LTE, intelligent field devices and secure big data applications are

already available. The biggest challenge is the need to define completely new processes beyond departmental boundaries and to introduce them. In doing so, the requirements for individual areas change significantly in some instances. This requires enormous innovative force as it also encounters internal opposition at times.

Our global success in recent years is due in particular to projects in which we were able to use our Engineering Base platform to define and establish new processes together with our customers. Through its strong growth and dramatically enhanced focus on data management across the entire plant life cycle,

AUCOTEC has also learnt how to deal with changes and new processes within the company.

Thus we not only offer the ideal software platform, but also the necessary experience and expertise to ensure your success when searching for your universally specific solution. You will find many suggestions in this Info Paper.

**Yours faithfully,
Uwe Vogt
Management Board**



sps ipc drives



**Nuremberg,
November 22nd - 24th, 2016
Hall 6 / Stand 110**

**We are looking
forward to
meeting you!**

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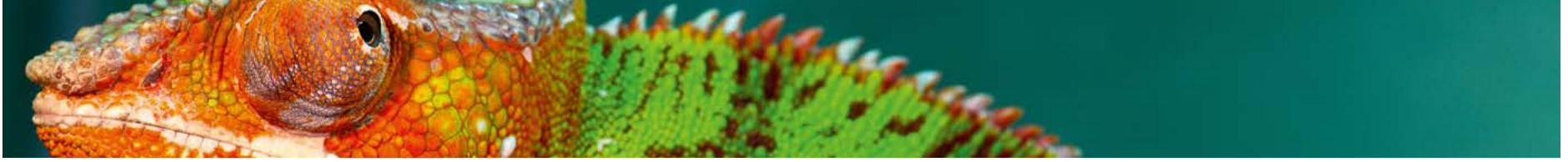
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status. The adoption of modifications during commissioning and maintenance is also much safer, offline as well as in online editing, due to the data centralization.

**Project overview:
it's not possible to be any clearer**

To manage the levels of information of subcontractors, EB provides an easily comprehensible overview which can be individually configured. The system shows which change belongs to which level. Designers can refer specifically to

this data when communicating with suppliers, customers and colleagues. "It's not possible to be any clearer," emphasized Reinhard Knapp.

It is not only possible to trace versions in an object-specific manner, but also in a recipient-specific manner. Thus it is possible to trace all information pertaining to a particular supplier or certain versions in a centrally stored information package, instead of in several self-made files that are often stored locally. Furthermore, the supplier receives only

the data that is relevant to him and thus saves a lot of time that would otherwise be spent searching.

**Consistent at every stage:
as-built documentation**

During the revamping and expansion of operating plants, EB allows the respective subproject data to be exported separately. Although this does not affect the status of the current documentation, users are informed of the exports. After the largely automated integra-

tion of the changed project, EB also marks or reports each revision and any possible discrepancy. There is no as-built documentation in use that is more reliable!

With this overall concept for change management, EB creates, in a highly transparent and time-saving manner, a unique consistency and speed for cross-disciplinary changes, without system disruptions and lengthy comparison runs.

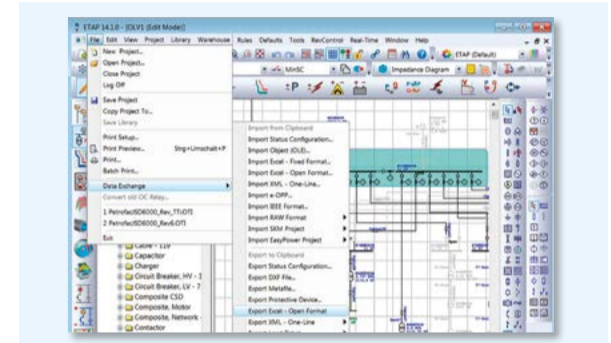
Simulation desired!

Convenient data exchange between EB and ETAP simulation software

Simulation is a highly efficient and effective approach to the analysis of structures, functions and the behaviour of machines and plants in a digital model. However, the simulation software must first be "fed" with technical information about the plant for this purpose. This is often very time-consuming and erroneous as a result of manual entries. Users of the globally distributed simulation tool ETAP from the US provider ETAP Automation, Inc. can now obtain the required engineering data by simply importing and exporting from EB (Engineering Base) and return changes. The standardized data exchange is already used in an initial project with the Norwegian company Kongsberg

Maritime. It quickly and securely provides the relevant information from the other system to the engineers on both sides.

ETAP's model-based architecture allows simulation processes which are faster than in real time, and it is a perfect fit with EB's database-driven nature. This solution provides information about the future behaviour of a plant in a fast and very reliable manner and allows timely corrections before commissioning. We are already working on a further extension of this link, which will make data access more convenient and direct on both sides.



> Engineering and simulating: EB and ETAP are "in tune" with each other

Potential savings for EnerValley

Technology Day "Power Grids" indicates a 75% saving of time

The Zeche Zollverein Coal Mine in Essen provided a historic backdrop on September 27th for AUCOTEC's fifth Technology Day, which focused this time on power grids. The decommissioned mine and the view of the surrounding countryside, instead of the smoking chimneys that dominated the Ruhr area in the 1960s, symbolically bore witness to the massive changes that are now also posing enormous challenges for grid builders and operators.

"Taking advantage of opportunities instead of fighting change"

Key speaker Dr Thies Clausen, energy industry expert with the change management experts of the Berlin-based communi-

cation agency Johanssen & Kretschmer, stressed: "The energy industry is changing in a disruptive manner. The innovative force of this change corresponds approximately to the changes induced by printing and the steam engine – combined!" This is the "Decade of Grids" in his opinion. There was also a need to link gas, water and, if required, new sectors in addition to electricity. This requires immense information processing in real time. In a nod to California's Silicon Valley, however, Dr Clausen also spoke about Germany's major opportunity to become "EnerValley". His appeal to the guests: "Companies must seize opportunities instead of fighting change. Any company that does not adapt will go to the wall!"

75% faster

The participants of the Technology Day are already in the throes of change. Presentations on practical examples from SAG, TransnetBW and TenneT impressively demonstrated how the digital data model of a plant results in a significant saving of time, while improving the data quality and its reliability at the same time. These factors are essential for them because time constraints and project volumes have vastly increased.

TenneT's figures could hardly be more impressive. The mere use of AUCOTEC's system Engineering Base (EB) yielded the grid operators a 20% saving in workflow through its functional orientation, among other things. TenneT referred to EB's Advanced Typical Manager as an additional turbo. This reduced the number of project templates and typicals from 30,000 to less than 10,000 sheets. In addition, AUCOTEC Product Manager Michaela Ott reported a 75% saving of time during the configuration and creation of the wiring manual for a substation. This was expressly confirmed by the TenneT engineers who were present. Since some people may not have heard the "at least" that was added, it should be mentioned here again.

New lines of business

For SAG CeGit, EB's optimized data storage was more of a deciding factor in its use because digitization and exploding volumes of data required new methods, explained SAG's software expert Dr David Echernacht. SAG understood the challenges for operators and provides process analysis and



> Almost the most important aspect: personal conversations during the breaks

advice with its new "Asset Master" in order to reduce maintenance costs. Furthermore, EB is also recommended because its openness and database-driven nature enable operators to significantly reduce data redundancy and structure plants more efficiently, while complying with all relevant standards.

Saving even more in the tendering stage

Other experiences were illustrated by the evaluation report on the grid operator TransnetBW, which was won over by EB's process optimization and savings potential with the help of a feasibility study called "Proof of Concept". The mutual trust and openness based on it, which link both companies, are crucial to the validity of the analysis according to Gerd Obenhack-Rehberger from AUCOTEC. Transnet was surprised by the result: The engineering itself is not at the heart of the savings, but rather the tendering and preliminary planning phases with their as yet immensely time-consuming comparison of supplier data, which is greatly simplified and accelerated with EB. We will report in due course on how practice becomes efficient from the study.



> Symbol for change: a decommissioned mine as the backdrop for Technology Day



Image: iStock.com/BlackJack3D

The Engineering of Things

How the Internet of Things is changing engineering

The Internet of Things (IoT) ensures a change in roles for plant designers and operators. The future Industry 4.0 reality will involve autonomous, learning devices and components. Will there be a parent instance that issues instructions? Will there be central controls which query, process and forward information? This will be a thing of the past to some extent at least if machines and products operate and communicate independently with each other in the grid.

Responsibility shifts

Thus plant operators relinquish quite a bit of responsibility. While developers get quite a bit of additional responsibility. They need to design self-sufficient systems which will respond flexibly to changing situations and communicate indepen-

dently. This requires mechanisms which ensure that a production station operates safely and reliably, without excessive regulation, because it is impossible to completely anticipate all future situations of all (self-sufficient) components that are involved. Control systems are increasingly becoming analysis tools. Their effectiveness depends on how well they correlate the incoming information to the correct devices and functions and interpret it.

Requirements from two worlds

On the one hand, the requirements for the engineering of devices have greatly increased, especially if they are also to be able to move freely. The hardware design of increasingly more intelligent subcomponents - with more and more sensors and

actuators - places the highest demands on data management and change management. Components are grouped together hierarchically in turn to communicating "organisms". Thus it is essential to be able to perform engineering in a function-oriented manner. On the other hand, the organisms must be "in tune" with the analysis tools, for example, for predictive maintenance (for more information, see Info Paper 1/2016).

For both requirements, Engineering Base offers highly efficient solutions as an integrative, cross-disciplinary platform which can optimally link software and hardware design - due to its knowledge which is held centrally in the data model via function and software modules. Only those who understand both worlds can perform engineering which complies with the IoT.

"Simply unbeatable!"

Engineering professional Thomas Hennerbichler outlines challenges for general contractors and the daily routine with large amounts of data



> Thomas Hennerbichler

Thomas Hennerbichler (29), a graduate of the Höhere Technische Lehranstalt (Higher Technical School) Leonding, has worked as a project engineer for eight years at the plant designer TBP GmbH in Linz, Austria. There, he is responsible for engineering and documentation and has gained experience with a wide variety of systems. At AUCOTEC's Technology Day "Plant Engineering" on 16 November 2016 in Munich, he will give a presentation on designing as an EPC and the advantages of central data storage.

As a general contractor (EPC), TBP offers its customers comprehensive engineering solutions from a single source. What are your biggest challenges?

It is enormously challenging time and again to merge the documents and requirements of different suppliers and customers in order to achieve a homogeneous and consistent structure. There are also ongoing innovations and changes in process technology for customers and suppliers, which require a high degree of flexibility and reliability.

What importance is attached to change management in your industry?

Very high importance! Changes are part of the daily routine in our business. It is extremely important for everyone involved that all corrections which were inevitably incurred in the course of a project are represented in a transparent manner. If they are communicated and documented clearly and unequivocally, they cause far fewer problems when assembling and commissioning, which means less time, less costs, and more satisfied customers.

The construction of a new wheat starch plant was your first big project with Engineering Base (EB). Why did you decide to work with EB and what were your expectations?

Our former client Südzucker required us to complete the pro-

ject with EB. After initial training courses and workshops, we had a pretty good idea of the potential of the platform, and took up the challenge to complete a major project with the new system. We have hoped for a lot of synergy from the principle of data-centric work. The data of more than ten different suppliers had to be integrated into the entire plant for this project. Despite the large amounts of data, this task was actually surprisingly easy to solve with EB. That was in 2013. We now also use Engineering Base for other projects, especially in the I&C design engineering, and remain in close contact with AUCOTEC.

In the course of the starch plant project, you developed "Advanced Data Tracking" together with AUCOTEC. How did it come about and for what is it used?

We needed a change management that would systematically track the status of data and could also clearly present it. AUCOTEC saw major benefits in it for other customers also. We thus created a concept in close cooperation. Data tracking now enables all changes to be automatically recognized and indicated without any effort in the entire project phase both internally as well as in customer and supplier systems.

To do so, you set "tracking points" from which EB generates a list of objects that should be checked for changes. This works down to the specific attribute. The points can also be set in a recipient-specific manner. Clients can thus always see which supplier received which version at which time. Furthermore, suppliers only receive the data that is relevant to them.

What other practical experience have you had with EB?

Mass data is part of our daily routine, and EB is simply unbeatable for processing large amounts of data! The handling of the worksheets as a query in the database and the data export/import make data handling uncomplicated and thus much faster and more secure. Furthermore, a wide variety of documents can be created and centrally managed for all departments.

Who can benefit the most from EB in your opinion?

All those who work on large projects with mass data and dif-

ferent suppliers. The advantage lies in the consistent data model. All users benefit from the fact that this data is only managed once across several departments. If new standard equipment such as a contactor or hook-ups are needed, they have only to be created once. Everyone involved can use this data immediately.

How do you estimate the benefits of a digital data model for the operator?

Consistent documentation from P&ID to the terminal is extremely important for the maintenance sector. In the event of malfunctions, it shortens the search for documents and thus costly downtime. Incorrect documentation is immediately visible in a digital data model. The navigation via cross references simplifies the search for documents and detects missing references.

Where is engineering heading in your opinion? How does the industry or you as an EPC need to prepare yourselves?

Ever shorter project runtimes and the handling of the most diverse requirements need ever shorter response times. Moreover, the complexity of projects will also continue to grow. This calls for easy data handling. I think that it would be impossible to manage this without a central data model. EB provides a solution that easily manages a variety of plant structures and creates all documents, from the process flow diagram to the block diagram, in one data environment. To consider the overall design, you really need, especially as an EPC, a system with as much versatility as EB.

Thank you very much for this interview, Mr Hennerbichler!



Images: Claudius Peters

Database instead of data islands

Claudius Peters relies on data instead of documents

The specialist for bulk material and process engineering Claudius Peters (CP) is at home in the cement, gypsum, coal, steel and aluminium industries. The company, which dates back more than 100 years, designs and manufactures storage bins, conveyors, silos, grinding and packing systems, gypsum homogenizers as well as bulk material engineering for different areas. The globally operating Claudius Peters Group GmbH is based in Buxtehude in the south of Hamburg.

From a document-oriented to a data-oriented approach

The decision in favour of AUCOTEC's software system Engineering Base (EB) was made during an innovation project with the objective of

developing CP into an outstanding company of the 21st century. EB's consistency, process acceleration and simultaneous increase in quality were decisive factors in this decision. Thanks to EB's open data model, the data is now the central starting point of engineering at CP, rather than the documents. They are only an "incidentally" resulting representation of the current status. "For us, EB is a success story and the foundation of the transformation of our software environment," explained Ulrich Cord, Group Manager Automation and EB Project Manager at the CP Group subsidiary Claudius Peters Projects GmbH.

Smoothly simultaneous

The new system fulfilled the most important

requirement of the bulk material experts: the networking of their data and tools. Cord emphasized that EB has built interdisciplinary bridges and he spoke of a new culture of communication. The mutual understanding of process and electrical engineers has been significantly strengthened. "This has a positive influence on the design process." The simultaneous editing of a project works smoothly, even with 20 users. The common data model ensures that all information is up-to-date.

EB sets standards

After EB's implementation, the focus was on standardization. The main task was to wisely anticipate and structure components, modules and plant sections. When such ready-

made standards are stored once in EB, project runtimes can be significantly reduced even further and new designers can more rapidly become familiar with the system.

EB can also improve the interaction of company-wide software tools such as ERP and 3D and further reduce redundant data maintenance. Also in terms of Industry 4.0, CP considers EB's possibilities, for example, when linking design data with operational and malfunction data. Ulrich Cord's conclusion: "EB supports our engineering consistently and intelligently. Thus, in the long term also, we will more than fulfil our mission statement of providing 'world-class engineering for world-class customers.'"

Brückner builds a bridge between mechanical and electrical systems

New engineering system links and optimizes design processes

With the Brückner Group company Brückner Maschinenbau GmbH & Co. KG, AUCOTEC has succeeded in convincing the global market leader in film stretching technology to opt for its software system Engineering Base (EB). The decisive factor in this case was the film experts' desire to optimize their various design processes across disciplines. "Merely replacing the electrical CAD was too short-sighted as far as we were concerned," explained Werner Bamberger, Head of Electrical Engineering and Automation at Brückner's southern Bavarian site in Siegsdorf.

Universal efficiency

"It is this approach that can raise optimization in engineering to a considerably higher level, where improvements in individual disciplines, which are of course always possible, lead to really significant universal increases in efficiency," said Uwe Vogt, Executive Officer for Engineering at AUCOTEC AG.

Standardization

In recent years, Brückner has strongly driven the standardization of machines. "In light of the above, we wanted to optimize

the interface between electrical and mechanical systems," said Bamberger. It was intended that the new CAE system would not only provide the relevant capabilities, but also support the function-oriented mechatronic approach from the outset. Another prerequisite was the easy and clear implementation of the internationally binding standard IEC 81346.

Networking disciplines, also easily integrating external data, unique, i.e. central data input, clear and consistent device designations in various documents such as machine overviews, P&IDs, circuit diagrams or plant documentation and - essentially - comprehensive versioning and release management: all of these were as decisive in choosing the new engineering system as the simple and consistent link to SAP.

All prerequisites

SAP integration has already taken place and Brückner has just gone live with EB in its mechanical design process. "The EB platform satisfies all prerequisites for making our processes more productive, and for improving our quality at the same time," said Werner Bamberger. However, the mechanical



engineering professionals at Brückner are also impressed by AUCOTEC itself. "The mindset there, the networking philosophy and also the company's size are a perfect match for us, this is more than a business relationship," said Bamberger. His conclusion: "We have a lot planned for EB. It's good to know that future requirements will also be in good hands with this system."

And furthermore ... the following companies, among others, have recently opted for AUCOTEC:



ANI CO., LTD.
Suwon-si | South Korea



Atlantic International
Holding Company Limited
Accra | Ghana



DB RegioNetz Verkehrs GmbH
Frankfurt am Main | Germany



Fujikura Automotive Mexico
Salamanca, S.A. de C.V.
Rancho Valtierra | Mexico



KONGSBERG
Kongsberg Maritime
Engineering AS
Sandefjord | Norway



Milacron Plastics Machinery
Jiangying | China



REN project
Prague | Czech Republic



WindStrom Erneuerbare Energien
GmbH & Co. KG
Edemissen | Germany

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