



# FROM INTEGRATED ENGINEERING TO PAPERLESS FACTORY

## Aebi Schmidt achieves global PDM and 3D-supported product assembly based on the central SAP system

With eight well-established brands, the Aebi Schmidt Group is a global leader of intelligent solutions for the treatment of mission-critical infrastructure areas and demanding terrain. For example, for the cleaning and clearing of infrastructural areas, or the maintenance of green spaces in challenging terrains. The competitively broad equipment and vehicle portfolio of the group is manufactured in twelve different production facilities in seven countries: Germany, Poland, the Netherlands, Switzerland, Finland, USA and Canada. To enable multi-site engineering, the company has created an SAP-based central PDM platform by introducing DSC's Engineering Control Center and SAP Engineering Control Center. This has also paved the way towards the paperless factory. Urs Lauber, CAD / PLM Administrator at Aebi Schmidt Group, talks about the different approaches, the lessons learned, and the successes so far.

The company, which today operates as a global group, was previously a rather loose association of individual and regionally operating organizations. That is why not so long ago, each individual site managed the product-related data (CAD documents, project documentation, etc.) in a different way: partly in the SAP system, and partly in differently structured project folders stored on the network drive. Collaboration was challenging as it was often unclear where which document was stored and which version was valid. This is why we decided to unify the product data management – based on our central SAP system.

# PROJECT OVERVIEW

## HIGHLIGHTS

- Central PDM platform for multi-site / multi-CAD engineering
- Integration of CAD systems, MS Office, and MS Outlook
- Parallel operation of the ECTR and SAP ECTR integration solutions
- Production planning / assembly based on 3D CAD data
- System performance monitoring for all sites

## CHALLENGES

- Suboptimal site-specific product data management
- Long data search times and difficult design collaboration
- Conditional suitability / reliability of factory assembly folders
- Unsatisfactory SAP response time at remote clients

## GOALS

- Central PDM platform based on SAP ERP / PLM
- Better collaboration between sites in engineering
- Assured quality of results in production assembly
- Monitoring-based optimization of the system performance

## SOLUTION AND SUCCESS

- Utilization of SAP as an integrated ERP & PDM system
- Integration of the relevant engineering tools in SAP
- Easy creation of an own global database for standard parts
- Significant increase of productivity in engineering
- No more actual paper documents in production (paperless factory)
- Visual work scheduling based on 3D CAD data
- Fail-safe product assembly with animated 3D instructions
- Considerable reduction of average SAP response times



## WITH ECTR TOWARDS A GLOBAL PDM PLATFORM

Within the PDM4ASH project, we introduced Engineering Control Center | ECTR – with DSC Software AG as our project partner. ECTR seamlessly integrates all types of authoring tools into SAP ERP / PLM, and offers multi-CAD support. Additionally, the intuitive SAP cockpit provides the SAP data to users in an appealing form. ECTR enabled us to integrate Siemens Solid Edge, supported by Solid System Team GmbH, and Microsoft Office (for project documentation, product descriptions, and so on). Furthermore, we introduced the DSC add-on **++Outlook** for e-mail integration.

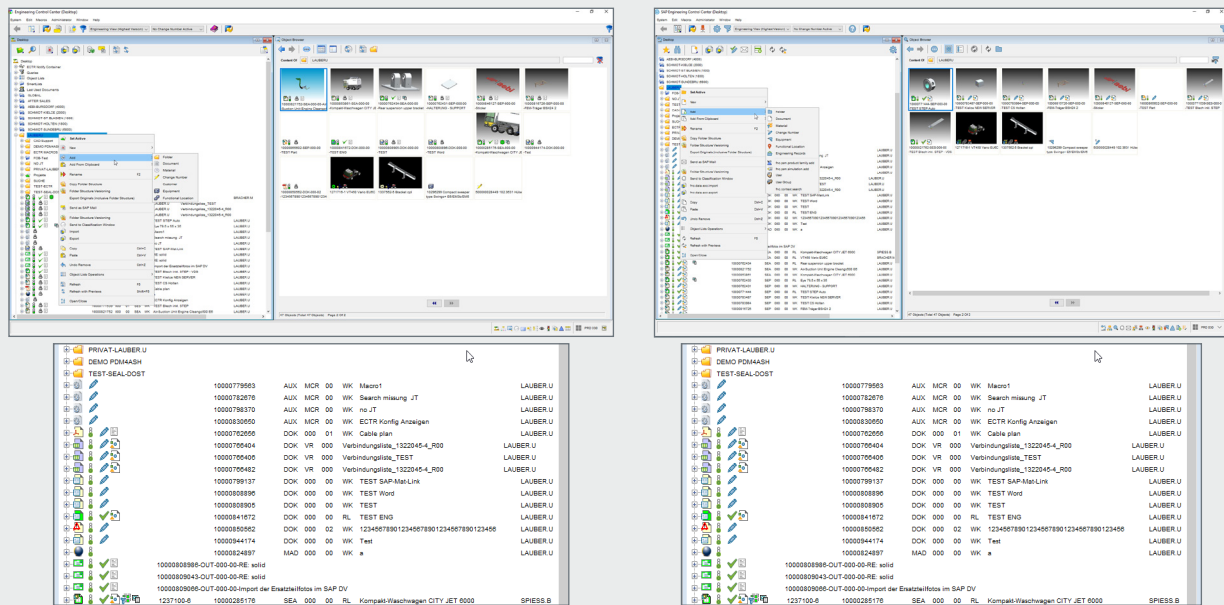
Since then, users can create, change, and store documents in a controlled manner – all integrated into SAP DMS, engineering change management, status networks, and so on. In ECTR, users can also easily trace statuses, history, versions, and validities – the traffic light system and the colored icons make this more straightforward. Users can also just as easily find the documents required, map product structures, and link CAD files: with each other, or with corresponding documents, or business objects (materials, and so on).

With this, we have a PDM platform that provides consistent and reliable up-to-date data across all locations, and simplifies teamwork. Our design engineers can get a faster and overview of all relevant information, including SAP material master data. We also benefit from a standard parts database, which ECTR allowed us to create very easily, and without additional software.

## ECTR AND SAP ECTR SIDE BY SIDE

Some time after implementing ECTR, SAP Engineering Control Center | SAP ECTR came into the game. On the one hand, because we also wanted to integrate electrical design at some point. On the other, because the paperless factory had come into focus. As a further development of ECTR, SAP ECTR has become the standard interface for integrating authoring tools into SAP PLM. It also offers more options, for example by embedding SAP 3D Visual Enterprise.

In order to use ECTR and SAP ECTR together, we had to update and slightly modify ECTR. We could copy the client settings from ECTR, and these worked in SAP ECTR from the start. Finally, both solutions ran in parallel on some computers, without any frictional losses. Additionally, ECTR users could also use SAP ECTR because the GUI is identical except for some slightly different icons.



Comparison of the SAP cockpits of ECTR and SAP ECTR

## PAVING THE WAY TOWARDS THE PAPERLESS FACTORY

As we already had the MCAD data in our SAP system, SAP ECTR with the integrated SAP 3D Visual Enterprise Viewer was ultimately our springboard towards the paperless factory or production assembly. Previously, assembly instructions consisted of Word documents, drawings, and photos, sometimes with personal notes. In addition, the assembly process often required product-specific expertise. This kind of expertise is missing when new staff is involved, or when prototypes and technically changed products are assembled. In any case, the team has to install the parts and assemblies correctly and promptly. Animated step-by-step instructions can help remedy this situation.

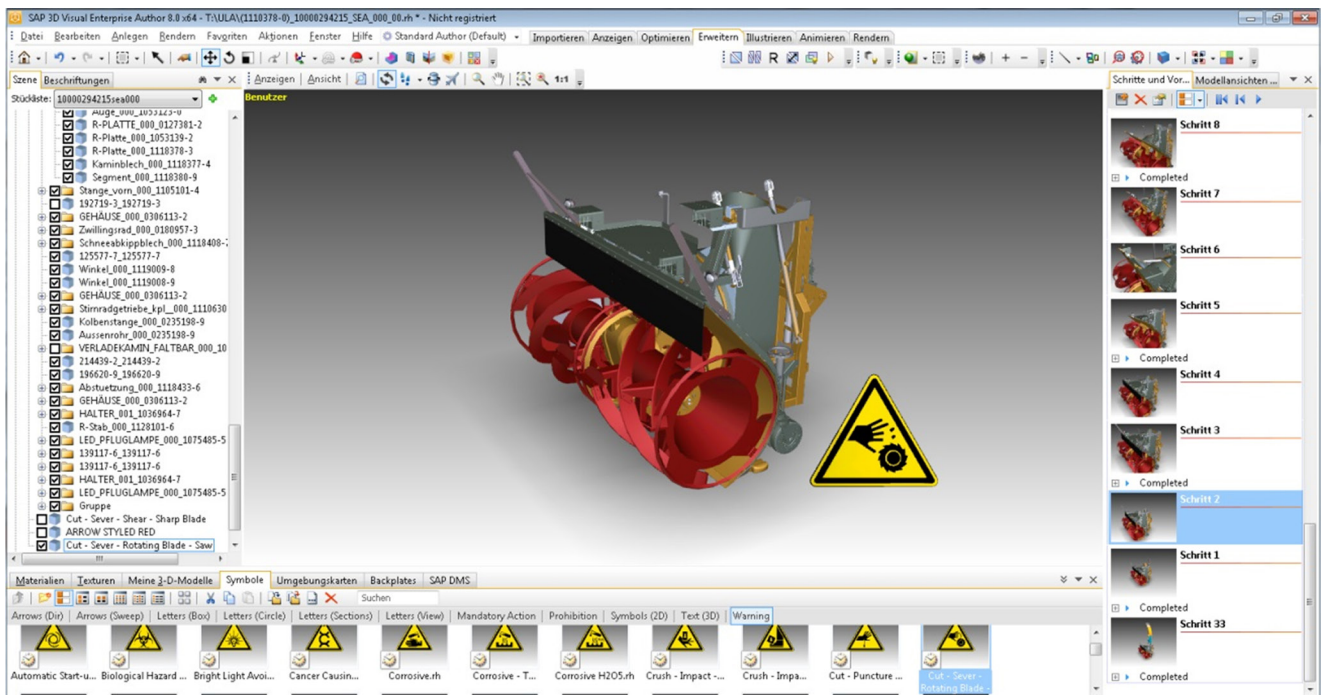
Regarding completeness and timeliness, we need a solution that we can integrate into our SAP processes. Furthermore, there must be the option of mapping variants and customer-specific adaptations, and the solution must be scalable and expandable. Considering all these requirements, SAP 3D Visual Enterprise is ideal.

## FROM THE CAD MODEL TO ASSEMBLY INSTRUCTIONS

The concept starts in engineering, where a concrete product variant emerges, including a 3D CAD model and EBOM, based on the maximal configuration. SAP 3D Visual Enterprise Generator converts the native CAD assembly structure into a neutral file format. In the SAP system, this file is automatically transferred to work planning, where SAP ECTR is used in addition to SAP PP.

Design engineers think in assemblies, while workers think in operations. The work planner, therefore, converts the assembly structure into a manufacturing structure: by transforming the EBOM into an MBOM, and by creating a routing. This all takes place in a 3D-supported process using SAP Visual Manufacturing Planner | SAP VMP. Finally, the work planner generates a 3D visualization file with SAP 3D Visual Enterprise Author, creates the assembly instructions, and animates them, where necessary. This is very simple, and only requires about two to three times the simple assembly time.

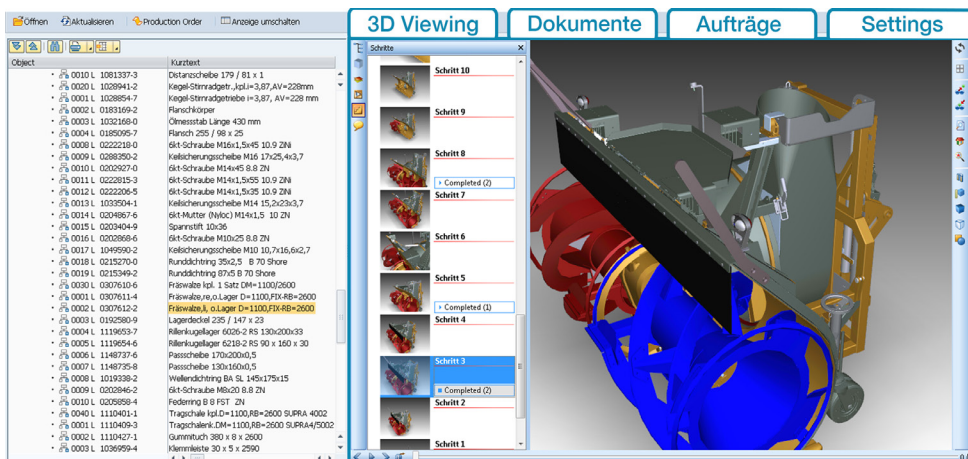




Creation of animated step-by-step instructions

Together with allvisual AG, we developed our own Manufacturing Cockpit. This provides assembly workers with the production order, routing, MBOM, and the instructions. The instructions are attached to the corresponding operation as a production resource, and can be displayed with SAP 3D Visual Enterprise Viewer – both on stationary, and on mobile devices. The Manufacturing Cockpit currently still works as a prototype version. The go-live introduction will take place as soon as other more important projects are finished.

ASH Manufacturing Cockpit for assembly workers

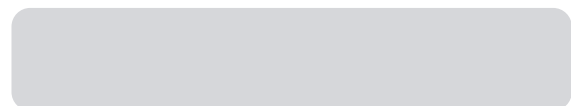
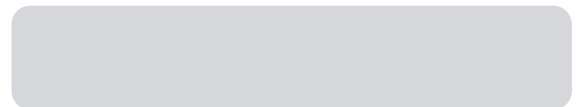
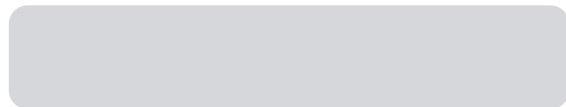


## WHAT DID WE LEARN SO FAR?

A global SAP-based PLM platform helps users to work more reliably, but does not automatically reduce work times. Possible reasons could be the network infrastructure, or the explosion of CAD structures on the SAP side. In any case, performance monitoring and testing are worthwhile in order to identify useful optimization approaches, if necessary. We use the DSC add-on **++monitoring** for this, and were able to significantly accelerate the average SAP response time at the clients.

Product assembly does not improve on its own either. The transition to 3D animation models makes it necessary for design engineers, work planners, and assembly workers to rethink their way of working.

Our experience shows that this requires an intensive discussion of the work methods, and of the handling of CAD models, product structures, and bills of material. It is a fact that product assembly is only as good as the instructions and CAD files provided. Also, even the most perfect CAD files or instructions will not do any good if the assembly workers ignore them.



## THE SUCCESS SPEAKS FOR ITSELF

Without a doubt, the key success factor of ECTR is clear information on the CAD documents' storage location and validity, and the elimination of long search times. Certainly, this is one of the main reasons for the significant increase of productivity in engineering. In addition, it is probably why other departments also like using ECTR. For example for the handling of MS Office documents. This is particularly true in the area of After Sales, for manuals, spare parts catalogs, and so on – with connection to our webshop. The paperless factory is another great achievement. After all, ECTR, SAP ECTR, and SAP 3D Visual Enterprise have helped us make a significant step forward in the implementation of Industry 4.0.



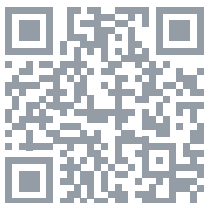
**In conclusion, we can say, with ECTR and SAP ECTR, we accomplished our goals. We were able to improve collaboration between sites in engineering, and successfully established paperless, 3D-supported assembly processes.**

**URS LAUBER**

CAD/PLM ADMINISTRATOR, AEBI SCHMIDT GROUP



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FOR INTEGRATIVE PLM**



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