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International Journal of Chemical and Pharmaceutical Engineering



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2010

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Fast and easy handling simplifies plant design in the process industry

Ralf Lehmann

Tricad MS is a design tool that covers all fundamental areas of a plant designer's daily work in the process industry – from diagrams and detailed design activities to implementation planning and assembly. Expert 3D modules are available for various applications. The number one development priority was, and still is, to ensure easy operation of the software as well as a consistent data workflow in all modules. This also convinced decision-makers at Kühni (now: Sulzer Chemtech Process Technology).

Kühni, founded in 1932 in Allschwil near Basel, is a leading technology venture in the area of thermal separation technology and membrane separation processes, in particular for separating and purifying aqueous and organic mixtures. Its business activities include process optimisation services as well as the design and implementation of process apparatus and turnkey, modular plants for the process industry, with the main focus on pharmaceuticals and fine chemicals. In addition to Europe, the company is also active in the USA and Asia. It recorded a turnover of 37 million CHF (around 23 million euros) in 2008 and currently employs more than 80 staff. Kühni became a part of the Sulzer group in early 2009; its Allschwil headquarters were promoted to the centre of excellence of Sulzer Chemtech's new Process Technology business

unit. "Kühni is in a position to deliver everything under one roof, from the feasibility study to the complete plant, thanks to several decades of experience in both engineering and implementation," explains Torsten Merly, Head of Mechanical Design.

Merly leads a group of four plant designers and is also responsible in this role for the selection, evaluation and supervision of CAD/CAE software for plant design. These engineering tools are important for the generation of P&I (process and instrumentation) diagrams, for the apparatus layout as a 3D model and for 2D views. Moreover, they are used for steel construction template designs, for designing pipelines including lists of materials and isometric drawings, for the pipeline layout as a 3D model and in the form of 2D views. Kühni opted for the Tricad MS design software from ITandFactory to deal with these tasks. Merly: "This tool connects MicroStation, our basic CAD program, with a customised database solution. MicroStation is a fully developed CAD software for 2D and 3D



Engineer Torsten Merly of Sulzer Chemtech Process Technology: "Tricad MS connects MicroStation, our basic CAD program, with a customised, cost-efficient database solution".

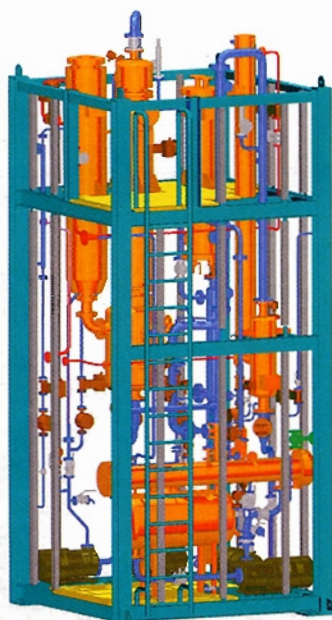
applications that is well established in the international process industry and has repeatedly proved its worth. In addition to this, the Tricad MS database simplifies the handling of material data and parts catalogues; comparable databases from other suppliers are too comprehensive and thus too expensive for our purpose". The 3D Pipe M module is used for pipeline design, the creation of 3D models and lists of materials. The Steel module produces template designs for steel construction, while P-Isogen is ideal for creating isometric drawings.

Plant for acid reclaiming process

"These modules are used in every plant project", Merly continues. He cites a current project for the contractor Weyland A/S in Bergen, Norway, as a good example: an order was placed for a plant to reclaim concentrated sulphuric acid.

Weyland specialises in the production of bioethanol from cellulose. The proprietary process converts any form of natural cellulose into ethanol on the basis of concentrated acid; the raw material is not only very versatile but also widely available.

The pilot plant in Bergen processes up to 2 t of cellulose every day, from which it produces more than 500 l of ethanol. It is used to demonstrate the functionality of the bioethanol technology. It also serves to fine-tune the process parameters for the various raw materials. Last but not least, it enables the ethanol yield – and the energy that must be expended for this purpose – to be verified. The acid recovery plant designed and built by Kühni is a crucial component of the Weyland technology – in terms both of environmental protection and resource conservation and of operating costs. The tech-



A plant planned for Weyland A/S and implemented as a skid-mounted system for acid recovery was presented by Kühni at Achema 2009 (left). The CAD model of the plant designed with Tricad MS is shown on the right.

TRICAD MS®		
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Digital factory design	Technical building service	Plant design
Materials handling technology Platform technology/structural steelwork Varnishing technology Envelope/tractory curves Crane technology Chip conveyor system Equipment layout	General layout Heating/coldness Ventilation Sanitation Electrical equipment Sprinkler Infrastructure	P&ID 3D piping Pipe categories Isometric drawing (Iso X) Structural steelwork
Database (vDB) Quality check	Report manager Collision assay	Construction modelling Viewer

Tricad MS is an all-inclusive CAD/CAE solution with a large number of design modules

nical parameters for the process were determined at the Kühni research centre in a preliminary design study. Merly: "The client will receive the complete know-how for the acid recovery process from us, together with all relevant information about control. On top of this, the contract includes the mechanical detail design and the manufacture of the main components".

Merly describes the role of Tricad MS in this and numerous other projects as follows: "With Tricad MS, we can coordinate the apparatus design, steel construction and pipelines and design them accordingly. The overall concept can be synchronised with the client and with all internal services (process, I&C, purchasing, etc.) well before assembly. We minimise the materials surcharge and thus lower the costs with the help of materials lists based on the 3D model". There is also another important aspect: "Thanks to the photo-realistic representation of a 3D model in NavisWorks, the

client can be included in the design process right from the start and coordinate the plant design using its own engineers and maintenance specialists". He concedes, however, that NavisWorks' lead over rival software has been reduced by the new option of a free 3D PDF file.

All-inclusive CAD/CAE solution

Tricad MS is a CAD/CAE product for all subsections of building management and factory design (heating, ventilation, sanitary, electrical, sprinklers, materials handling, plant engineering, steel construction, painting and coating, tractrix curves, layouts, etc.). The fundamental advantage is that the designer no longer has to employ different tools for complex projects and can remain in the accustomed environment. Hence, even a small specialist firm can cover all services and works. The operating

principle is identical for every module. What's more, the data is consistently available and only has to be entered once.

The engineering tool is based on MicroStation, the internationally popular CAD core system. The number one development priority was, and still is, to ensure easy operation of the software as well as a consistent data workflow in all modules. The integrated calculation options and standardised look & feel of the modules are key factors here.

Since every module is structured and used in the same way, there is no need for lengthy training and the learning curve for Tricad MS lasts only a few days. Its intelligence resides in drawing files (DGN files containing all technical information); a complex database is not required, though Kühni has created one as an option. The powerful Tricad 3D model maps the complete building or factory in this way; all components are available in parameter driven geometry and can be configured as desired. The entire technical data can be viewed without having to launch Tricad MS, simply by clicking the Info button.

Kühni's business activities include process optimisation services as well as the design and implementation of process apparatus and turnkey, modular plants for the process industry; Tricad MS with its various expert 3D modules, plus the straightforward handling of material data and parts catalogues in the database, represents a highly productive solution. Torsten Merly: "The current project for our Norwegian client Weyland A/S provides further confirmation that we have opted for the right tool."

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