“Turbo-Engineering” saves times and costs

TMS Turbomaschinenservice GmbH plans new steam turbines and inspection work with the engineering tool CADISON®. If the pipeline planning for a steam turbine requires with the help of a 3D model – compared to conventional 2D-planning – only 10 percent of the time, you can certainly speak of a “Turbo-Engineering”!

How has the Austrian TMS Turbomaschinenservice GmbH – the experts in the area of steam- and gas turbines – achieved this goal? Through the use of the engineering tool CADISON® and while developing a high degree of standardization with a variety of pipe classes. The quality – or in other words: the efficiency and with this the energy efficiency – of a technically very complex steam turbine, depends heavily on the expertise of designers, the smallest possible component tolerances in production and the goodness of the highly contaminated materials.

Providing high quality equipment is not solely the domain of large companies! While complementing the expertise of partner companies and harmonize working methods and business philosophies, also the smaller community providers can deliver high-quality at relatively modest cost.

TMS is an example for that. The staff working there plan and take over turbo-machine revisions. The services range from identification of the machine condition and repairs to the production and delivery of spare parts, but also rebuilding the hydraulically controlled machines to modern electronics on-line machine diagnosis and increasing machine-efficiency.

„We save 90 % of time against pure AutoCAD“
says Franz Sattler, Managing Director TMS

For the partner and co-owner General Turbo SA Bukarest, the TMS engineering office plans new combined cycle plants. On this basis, the manufacturing is then done by General Turbo. The results speak for themselves such as TMS CEO Franz Sattler says: “Compared to major vendors offering a complete machine range to the highest power ratings – like Siemens, Alstom, MAN – and compared to the low-cost providers, we score with two main advantages: Our turbo machinery achieve the high efficiency of large corporations but are considerably less expensive.”

General Turbo and TMS aggregates are used in the industry (often as co-generation plants for combined generation of heat and electricity), as well as in municipalities (district heating, biomass heating plants, incinerators). Orders for new machines in the range 15 to 17 MW for example are coming from the sugar, the petrochemical and paper processing industry.

Complete Basic and Detail Engineering

The TMS-planners in the Vienna office are completely responsible for the orders of the entire basic and detail engineering. The engineering part includes both, the mechanical and technical part and the plant design i.e. the integration of the steam turbine plant in the peripheral equipment (supply and disposal of various media).

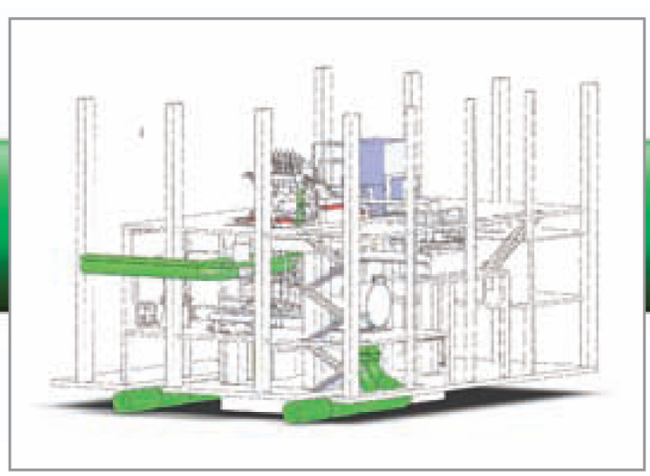
The planners are working with different tools:

- for the mechanical machine design - the turbine itself - TMS uses the planning tool SolidWorks
- for the process- and layout-design, the piping- and installation-planning of the individual machines, aggregates and components is done with the engineering tool CADISON®

The level of detail of the machine design is very high (3000-4000 hours of engineering!) The integration of the high level of detail is not required for the piping plan, only the outline (reduced level of detail) of the machine and the connection points of the piping is needed.

Object-oriented System Design

What make CADISON® in a special way as the tool differs from other planning tools? CADISON® was designed as an object-oriented database-driven engineering solution and not as a purely CAD tool! With the integrated database, all project data are automatic and immediately available in the various



The main advantages in the planning with the 3D solution CADISON®:

· the whole process from planning to installation of a system has become much faster and more transparent, especially in the literal sense
· changes are significantly quicker to implement
· the tool reliably manage very large amounts of data
· the planning effort for new facilities has dropped significantly

modules such as P&ID, 3D piping layout, isometric generation, automatic report generation etc. With the object-oriented data model it is possible, to integrate all phases of planning in one database - thus saving time and money. And it does not matter whether the project will start with technological engineering data or graphical data.

Each component of the machine is stored in the database and is accessed by users in the planning stages from there. This begins with the proposal, but does not end with the documentation. A component will be specified in the planning process more precisely, receives their media information, etc. – everything happens in the database. Stored associated information are always the same for each user in every module.

Standardization reduces the programming effort

Why was the choice at TMS for CADISON®?

"We wanted a system that allows us to plan all type of piping and where we get quick results. With CADISON® we have from scheme up to the material extract an integrated solution – and that saves us a lot of planning time"

A lot of work was spent for the standardization of modules and the introduction of different pipe classes – where they now benefit from.

"Because our equipment always has repetitive elements and changes from project to project are relatively low, the engineering tool CADISON® is for us the perfect solution."

Backgrounds: While planning steam turbines, five different 3D-patterns have to be planned: These are the pipes for the condensate cooling water, oil, steam and drainage. These supply – and waste-lines are part of every steam turbine and must always be re-designed new – changing only details of the planning but not its fundamental structure. This means, that a once proposed drainage pipe can be used again from one machine to another, just changing dimensions (for example, rather than DN 100, DN 300) and of course the geometric position. The TMS engineers can thus take over from previous projects to adapt the design and parts.

Sattler: "We have standardized these recurring design elements putting them into base modules with a maximum of options - and strike off the unnecessary pieces. Deleting is always easier and faster than adding! This works moreover for the offer text: the approximately 100-page document is base for the specific project-offer and stripped to e.g. only 30 pages.

"We need only about 10 percent of the time compared to a pure example AutoCAD 2D design" says Sattler. His conclusion is unequivocal: **"A 2D schematic drawing is compared with a 3D model CADISON® Stone Age!"**

Business Benefits:

· CADISON® offers advantages over 2D AutoCAD with savings on a level of approximately 1:10!
· MATPIPE – the catalog-system – efficiently manages standard components and pipe classes
· CADISON® provides an integrated solution from the scheme to material extract
· CADISON® is easy to learn and provides fast results