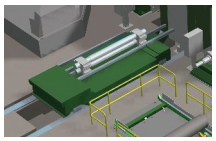
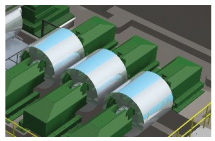
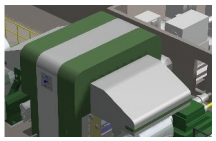
3D moves to a new level

Implementing best practice is the key to increased productivity

SIEMENS VAI

Siemens PLM Software www.siemens.com/solidedge

Business challenges

Maintain number one position

Standardize designs

Keys to success

Six-month investigation into working practices

Close liaison with reseller and Siemens

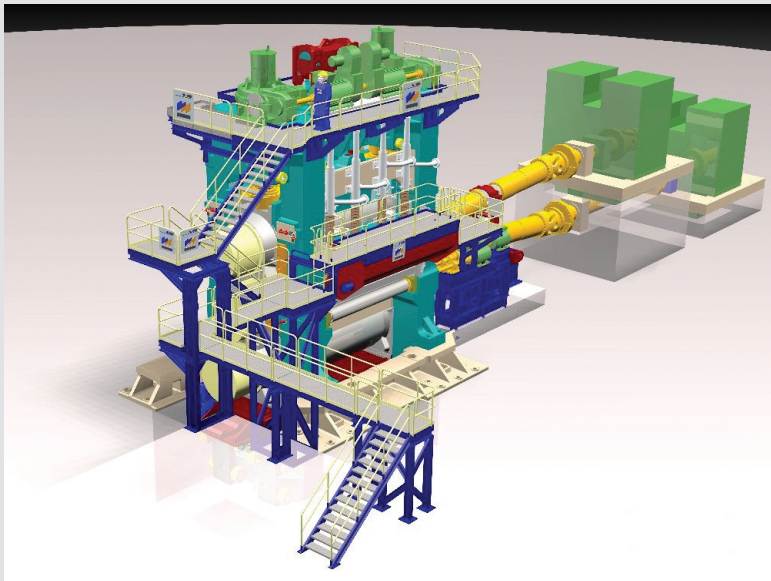
Creation of best practice guidelines

Results

90 percent improvement in CAD performance

A 3D experience

Like many companies, VAI Industries (now Siemens VAI) migrated to 3D in order to optimize the design cycle and support the sales process. One of these targets was clearly fulfilled when 3D visualization was used to sell 20 innovative new machines before the first model had even reached the production stage.



However, four years after the implementation of 3D, the anticipated reduction in design time was still an elusive ideal. Aleck Giles, CAE Support Engineer, explains: "We continued to have severe problems with performance when working with very large assemblies; we were running over on schedules and many users were extremely unhappy."

Working together, Aleck Giles and his team – reseller Solid Applications and Siemens PLM Software – were able to identify and resolve these problems. According to Giles, the Siemens VAI experience contains a clear lesson for all 3D users: "Success is simply about learning how to get the most out of your tools."

Both success and distress

With sites in Austria, France, UK, Germany and the US, Siemens VAI is the leading equipment designer for the steel and aluminum industries across the globe. Designs are custom-made and often very large. A plate mill which is three stories high and 5 m (16.4 ft) wide can contain 20,000 to 30,000 components; an entire plant could have 100,000 components. Prices and timescales are on a similar scale. A rolling mill could cost up to £30 million and take 6 months to design, with manufacture and commission taking another 18 to 24 months.

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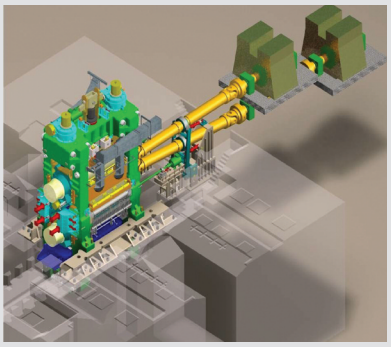
In 2002 the company made a group decision to move from 2D and implement Solid Edge® software. "We do simple, functional shapes, just huge numbers of them," says Giles. "There are no flowing curves and Solid Edge gave us a 3D solution without unnecessary complexity."

The new capability produced immediate results. "A request for tender can take 6 to 12 months of negotiation, and we are often selling to teams with financial expertise rather than engineering knowledge. Using Solid Edge we can show a rendered 3D model, and customers can immediately understand the way a machine looks and works. We can emphasize that we have an established design, it is reliable and we have done it before."

The success of this approach was confirmed when Siemens VAI launched a new range of shears in 2006. For example, a Crop Shear can cut a 5 m wide, 50 mm thick piece of steel in one move. "The clever bit is the gear boxes and the rocking motion which allow the metal to be guillotined in one move. After completing the first design, we could show a rendering of the 3D model which clearly demonstrates how the cutter works. We have so far sold 20 shears before the first machine has reached full production."

Despite the obvious advantages of 3D capability, users were frustrated. Giles describes why: "We found that when we were dealing with more than 18,000 parts in one assembly, we met with problems. For example, an engineer would request drawings, wait for three and a half hours without any result and then the computer would crash. We plowed on with implementation of 3D across more and more projects, but sometimes users would revert to their familiar 2D solution. By 2006 we were still only 30 percent on 3D."



Small adjustments create a big improvement

Giles turned to reseller Solid Applications for help. "We were given all the help we needed by Solid Applications and Siemens PLM Software," he says. "What really pleased us was that one of the most senior managers in the US came to visit. Solid Applications sent a top applications engineer who shadowed our engineers for two to three days and gave us a comprehensive report. This kick-started a six-month investigation. Later, a top troubleshooter from Siemens PLM Software also visited us from the US and gave advice."

At that time VAI Industries became part of the Siemens Group and under corporate policy all hardware was upgraded and the network, where drawings are stored, was enhanced. "This certainly helped but did not solve all our problems," adds Giles. "The turning point was the realization that we had to tighten up our own working practices."

The solution was actually a number of interlinked actions. Initial user training in Solid Edge had previously been condensed because of business pressures. A more complete schedule of training for new users was initiated, and existing users were retrained so they could establish new habits. Frequent user meetings were scheduled along with refresher and update training for each new release

of Solid Edge. Giles' training skills were enhanced through a TAP (Trainer Assessment Program) certificate. Furthermore, an agreed priority was to ensure that engineers receive relevant and timely training for the projects to which they are assigned.

Alongside this renewed commitment to user training, Siemens VAI has a set of best practice guidelines which dictates how all files are to be created. "We discovered that most of our problems came down to the quality of the data that we were creating," observes Giles. "There may be three ways to achieve a result, but one may be better for the computer and may make editing easier down the line. We have spelled out the right choices for the user."

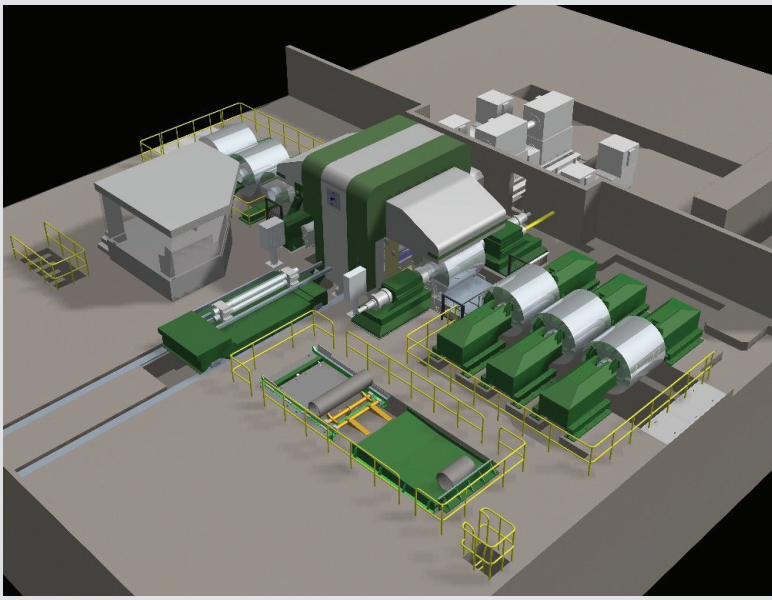
The company's best practice document describes the most efficient way to work in all relevant areas of Solid Edge. It states that features are to be kept to a reasonable minimum and sketches or reference planes are to be avoided if possible. All parts are to be simplified, with constraints only applied to related parts. Users are to employ the Occurrence Properties feature so that minor parts are not shown in higher levels and assembly drawings are clearer.

"One of the big advantages of Solid Edge is the ability to keep things simple and turn off certain detail," comments Giles. "At the top level, a drawing view of an 80,000 component assembly may only need to show 5,000 parts so the computer has less work to do. This just takes discipline and a few minutes per assembly. Likewise, a good assembly model should mimic real life and represent the way that a physical structure would be assembled. There should be no floating parts; users need to make clear decisions."

A 90 percent improvement in performance

The company now has assembly models that are easier to handle, edit and re-use. "We did a controlled experiment on one of our biggest, worst performing assemblies – a standard design with 25,000 parts," reports Giles. "The original model crashed after three and a half hours when we were trying to create a drawing view. After some rework to simplify major parts and specify Occurrence Properties, we had an improved, usable file and set some benchmarks. Then we remodeled the entire machine from scratch and compared the results."

The size of the original draft file was about 36 MB; the new one is just over 12 MB. The old assembly file took 35 minutes to open, the new file took 3 minutes. To obtain 4 drawing views meant a wait of 2.5 hours for the old file and 5.5 minutes for the new one. It took 5.5 minutes to update drawing views in the old file and less than 3.5 minutes in the new file.



Solutions/Services

Solid Edge
www.siemens.com/solidedge

Client's primary business

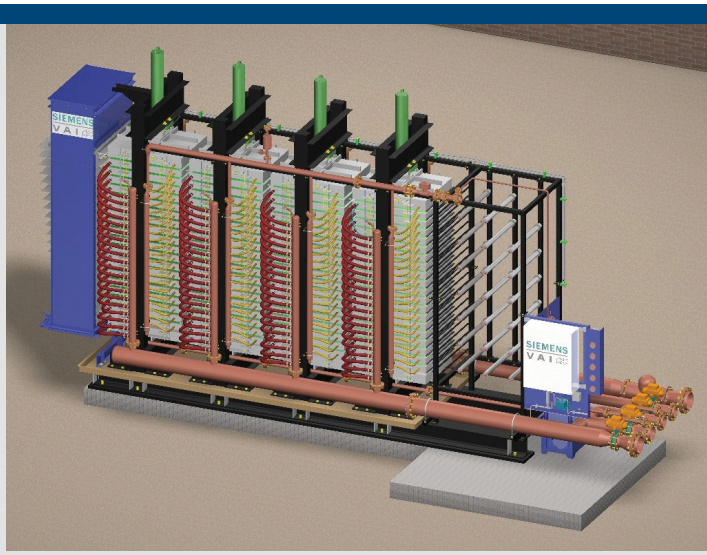
Design of equipment for global steel and aluminum industries.
www.industry.siemens.com/metals-mining/EN/

Client location

Austria, France, UK, Germany, Czech Republic and United States

"The support we received was first class. Siemens PLM Software, along with their resellers, really do everything in their power to live up to the slogan 'We never let a customer fail'."

Aleck Giles,
CAE Support Engineer
Siemens VAI Metals Technologies Ltd



"Multiply these improvements by 30 or 40 engineers on a project and the savings are huge," states Giles. "Best practice has resulted in over 90 percent improvement in performance," he notes. "Simplifying assemblies and utilizing Occurrence Properties are the most important parts of this. We have slashed waiting time. It's easy to blame the tool, but it is not the tool's fault. Users do not have to be perfect, but if they get 80 percent towards best practice we will get much better results."

Maintaining momentum

There have been fewer problems for Aleck Giles to deal with but he knows there is more work to do. "People are still recycling inferior models and some users still prefer 2D," he says. "Every model has to be checked or redone before re-use. However, our best practice guidance has improved user support, and we are on the way to design standardization and the savings that will bring."

Siemens VAI is now introducing best practice quality control internally; working with its suppliers to ensure that they are operating to identical standards; improving the control of standard and proprietary parts and implementing document management using Teamcenter® software.

"The support we received was first class and the Solid Edge development team created features just for us," says Giles. "Siemens PLM Software, along with their resellers, really do everything in their power to live up to the slogan 'We never let a customer fail'. We have overcome a lot of problems and Solid Edge is our design tool of choice. We know it can comfortably handle assemblies of up to 30,000 parts on a 32-bit PC, and we have achieved 100,000 parts or more on a 64-bit PC. We currently have 45 seats in the UK and expect to increase that to around 80 to 100 in due course. Our goal is 100 percent 3D engineering."

Contact
Siemens PLM Software
Americas 800 807 2200
Europe 44 (0) 1202 243455
Asia-Pacific 852 2230 3308
www.siemens.com/plm

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