

A cutaway CATIA V5 model showing IGX pump internals.

BOC Edwards: All or Nothing

Using Dassault Systems PLM, BOC Edwards has maintained its pre-eminent market position, improved design, increased engineering quality and made a positive impact on engineering and production as well as in the marketing department.



A finished product - the iH500.

In practice

BOC EDWARDS

Applied

By Nick Lerner

BOC Edwards is a world leader in vacuum technology for industrial, scientific, processing and semiconductor applications and employs around 4600 people worldwide. At its Sussex factories in Shoreham-by-Sea, Burgess Hill, and Eastbourne, the company uses CATIA V5 and SmartTeam to design and build vacuum pumps capable of achieving high vacuums down to 10^{-10} mbar. BOC Edwards invented the concept of the oil-free 'dry' vacuum pump and now markets a range of dry pumps using claw, roots, scroll, screw and combined mechanisms. Other product technologies include rotary vane, vapour diffusion, liquid ring, steam ejector and turbo molecular.

Vacuum pumps are used in a wide variety of industrial and scientific applications, but the company's biggest single market is the microelectronics industry, which depends on vacuum for the production of silicon wafers.

Innovation is critical to competing successfully in this global high technology industry where manufacturing processes are constantly evolving. New processes take place in harsh environments, often using highly corrosive chemicals. The average life of a typical semiconductor plant is three years, during which time the pump is working 24/7. A single batch of wafers can be worth thousands of pounds, so product reliability is vital. Customers are under pressure to reduce their costs in this

highly competitive market, and BOC Edwards is meeting this challenge by producing cheaper, smaller, more efficient vacuum pumps that perform to the highest possible levels required by the most demanding of industries.

The company has been using CATIA since 1989 and introduced CATIA V5 in 2001. By 2007 the company will have moved exclusively to CATIA V5 with more than 60 seats each equipped with ENOVIA SmarTeam and forming the hub of an enterprise-wide PLM system.

V5 PLM IN ACTION

At BOC Edwards, product development and operational and manufacturing processes are crucial to maintain its pre-eminent market position. One of the most important aspects of this is explained by the company's CAD manager, Timothy Draper. "To develop our pumps and the technologies that they incorporate and to ensure that they are made to the highest possible standards, requires us to work concurrently in several engineering disciplines."

He continues. "As experienced CATIA V5 users we can get the best out of the software. For example using parametric design we can capture knowledge and create template models for generic components. We also make extensive use of FEA within CATIA to ensure critical parts are correctly rated for their function." We make

Production bottlenecks removed.

extensive use of rendering for our marketing campaigns and are able to produce accurate and attractive marketing material well in advance of product completion"

BOC Edwards Process Specialist Mark Serejko takes up the story. "We started to look at how it was possible to remove production bottlenecks in the system. One of the major blocks was design. If you have to wait for a completed design before it is possible to consider engineering, that can be a major cause of delay. We are able to use Digital Mock Up (DMU) along with ENOVIA SmarTeam to provide engineers with information before the design is fully complete."

Thus at BOC Edwards, engineers have Bills of Materials (BOMs) and a relatively complete specification to work from so they can devise tooling and fixtures that will be ready when the final design is complete or even before that time. Taking the emphasis away from completion of a full design as a starting point for engineering has had some radical effects for the company as Timothy Draper succinctly puts it. "In the past people believed that a drawing provided the information about a product. Now Information exists in digital representations and by releasing that to appropriate departments they can start their work earlier."

TECHNOLOGY TRANSFER

This philosophy is partly derived from the automotive and aerospace industries where the use of DMU is standard procedure. Its use at BOC Edwards is an example of taking the most advanced ideas from one industry and

applying them to another. In this case it works very well by allowing insight to the whole enterprise as early as possible. Even procurement and production departments can commence their work well in advance of a final design becoming available.

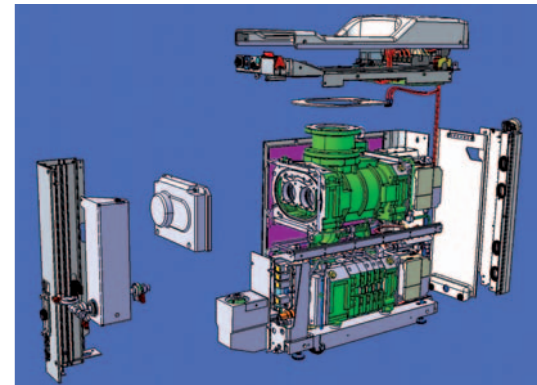
This way of working has produced other advantages at BOC Edwards. Mark Serejko explains. "The PLM system in place is being constantly expanded and developed to produce increasing levels of benefit throughout the company. Engineers and designers can work closely in a very efficient way. For example, finding space within a complete pump assembly to locate electronics or other components is a growing challenge as the overall size requirement reduces. Having access to the DMU earlier, means that these issues can be resolved sooner, and that leads to fewer hold-ups as we move closer to production."

PARTNERSHIP

The advanced PLM system at BOC Edwards has been considerably aided by business partner Applied. Timothy Draper says. "Applied understood our needs immediately and offered practical appropriate help and training. They did not try to take us too far too fast, but rather adhered to our plan in well-defined incremental steps. We work with them as a single team and develop our strategy and requirements for change together." Part of this arrangement provides task-specific training and the development of BOC Edwards' skills in areas such as V5 fundamentals, ENOVIA SmarTeam, and advanced assembly modelling.)

For more information:
www.bocedwards.com
www.appliedgroup.com

An exploded view of a pump assembly.



Dassault Systems PLM Benefits at BOC Edwards:

- Greater control over the engineering process
- Interoperability with Windows
- Design optimisation capability
- Full integration from art to part
- Quick, intuitive and flexible software
- Control over the product lifecycle
- Security of data
- Concurrent design capability
- Visibility of design status
- Adherence to standards
- Fast accurate communications enabled
- Better ultimate quality