

Case Study – Cosworth Technology

CADfix®

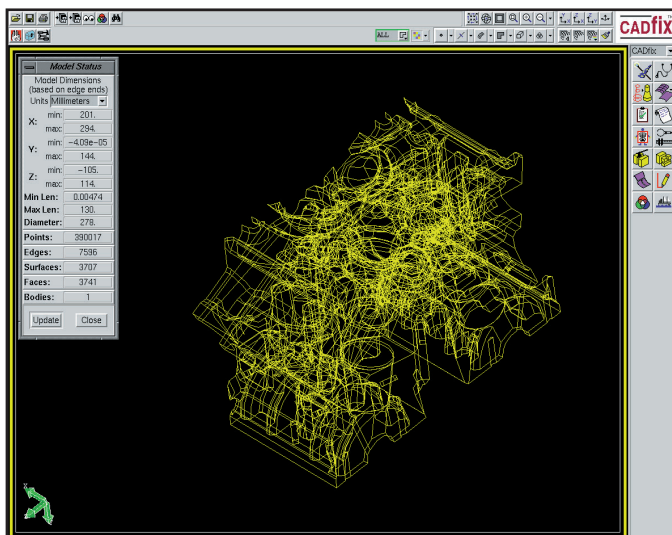
Cosworth Technology supercharged by CADfix

You're a major automotive manufacturer and you're looking to add a bit of sparkle at the top end of your range, a racy model for those customers who see themselves less as Joe Public and more as Jenson Button. Where are you going to go for your engine? Who can add the necessary sporting zip that will turn your family saloon into a growling panther squatting menacingly on the driveway?

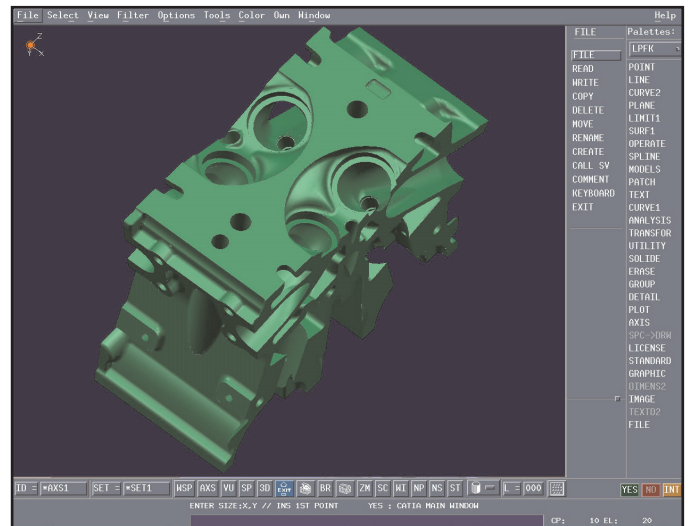
The fact that even Joe Public would probably tell you to call Cosworth demonstrates just how successful the Northampton based company has been in building a name for itself in the performance automotive design industry.

When Audi acquired the Cosworth group in 1998, Ford took over the Racing Division, leaving the Engineering, Castings and Manufacturing Divisions – those responsible for designing and building performance engines for production cars – to be reborn as Cosworth Technology, an autonomous division of Audi.

While the Cosworth of the 1980s made a name for itself with a series of punchy additions to the Ford range – particularly the Sierra – two decades later Cosworth Technology lists an elite string of high performance engines among its stable.



Computer block translation in CADfix



Engine block in UG

The Aston Martin V12 engines (from the DB7 Vantage and Vanquish), the Audi RS4 and the Ford SVT Focus, are three prime examples.

Cosworth Technology

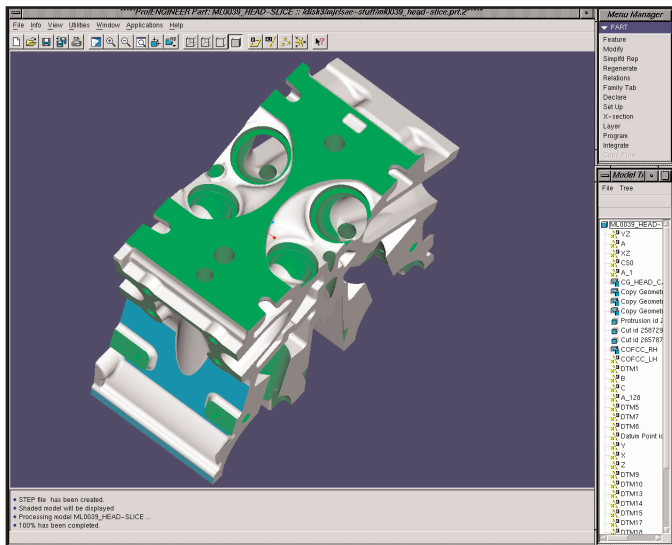
Today, though, Cosworth Technology is far more than just an engine builder. As Mike Robson, Principal CAE Systems Engineer at Cosworth Technology, readily states, "We consider ourselves a complete powertrain provider. Car Manufacturers come to us with a particular requirement and we will do as much or as little as they need. Often – because of our reputation and heritage – this will be the design and manufacture of a whole engine from scratch, but this is by no means the only requirement. We are regularly asked, for instance, to offer advice on the precise configuration of a particular engine component.

"Our projects range from a single cylinder head to a V12 engine," he adds. "And most configurations in between."

In order to be able to offer its consultancy services to as wide a range of automotive manufacturers as possible, Cosworth Technology must be able to guarantee that it can accept geometry from a broad spectrum of CAD/CAM systems. Unlike many suppliers it is in the fortunate position of being able to invest in licences of every major solid modelling solution and data import rarely presents a problem.

Translation issues

As Robson explains, however, the ability to accept geometry from multiple systems does not mean that Cosworth Technology has no need for data transfer. "It's horses for courses, really," he says. "We recognise that different modellers are particularly well suited for different engineering tasks. We might use Pro/Engineer for a cylinder head design or Catia for a



Engine block in Pro/E

complete engine assembly, for instance. Added to this is the need for our FEA team to translate into a whole raft of different formats for meshing. It is therefore vital that we are able to switch between modelling environments as easily as possible."

Until recently, Cosworth Technology, working with stand-alone translators, was regularly discovering translation errors. "We were probably able to convert 65 to 70 percent of the data sets with no errors," says Robson. "We recognise that there are always going to be some stubborn files, but we felt that anything below 95 percent would not be living up to our standards and expectations."

Enter CADfix

In June last year Cosworth Technology discovered what proved to be the solution to this data transfer bottleneck when it invested in a first seat of CADfix. CADfix has been specifically developed by Cambridge based FECS to address 3D interoperability issues. Its comprehensive series of automated and interactive tools provides an invaluable intermediary environment for transferring data from system to system, whether it be from CAD to a downstream application such as FEA or – as is the case with Cosworth Technology – between different modellers.

Interoperability issues arise because different systems have different ways of defining 3D geometry internally – hardly surprising given the inherent mathematical complexities involved. Even 'neutral' formats such as IGES fail to solve the problem adequately: minor differences in tolerance between the 'reading' and the 'writing' application can result in the former introducing gaps where the latter had merely neighbouring surfaces. More often than not the result is a confusing error message or an unrecognisable 'model'. There is no alternative but to go back and start again.

"We had one problem where had to convert a cylinder head from Pro/Engineer to other major CAD systems," says Robson. "We'd been working on this for a number of hours. We were able to achieve a fully surfaced model, but not what we really needed: a fully defined solid body."

Instant improvement

Within three days of CADfix being installed this problem had

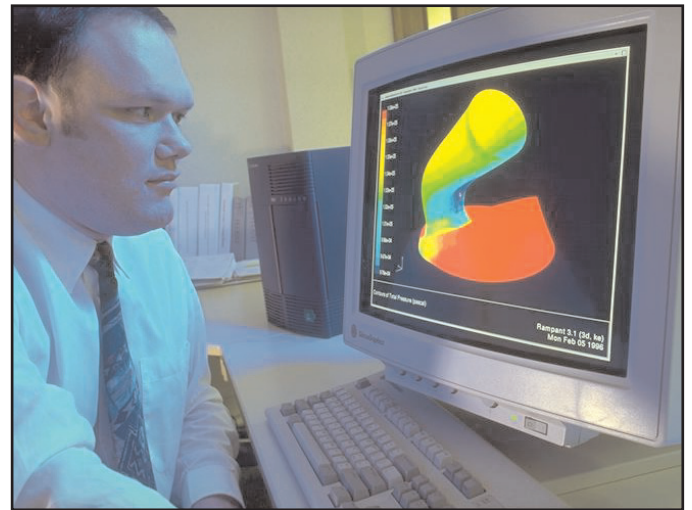
been solved. "It was a revelation," he says. "Without any training at all we imported a Pro/E model into CADfix, resolved the geometry into a coherent solid and exported the data into a format that would read smoothly into the other major CAD systems."

In just a short space of time CADfix has become the primary method for inter CAD translations at Cosworth Technology. For every new project that requires the use of multiple CAD systems – and most projects do – CADfix is used as the data hub. It has eliminated the need for data conversions that were not only resource intensive but would also eat into lead times. Further education

Indeed CADfix has been such a hit at Cosworth Technology that its use is spreading. Mike Robson explains: "As well as CAD to CAD translations for our own use we were increasingly being asked by our FEA team to help with converting from CAD to mesh."

Cosworth Technology's role as a consultancy means it has to offer advice on everything from emissions to driveability, from fuel consumption to engine diagnostics. Many of these disciplines demand specialist FEA techniques so it comes as no surprise that there are even more solvers than CAD systems at Cosworth Technology.

"Cosworth Technology's Analysis Department has also found CADfix of great use," says Robson. "They have found CADfix's de-featuring capabilities particularly helpful, so helpful, in fact, that we have invested in more licences. It looks like CADfix is here to stay."



Analysis at Cosworth Technology



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