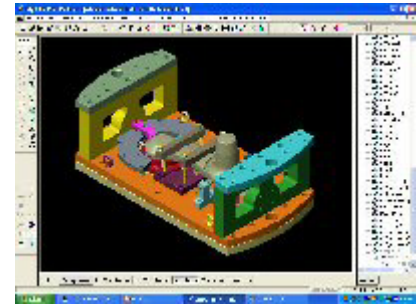


Investing in Outstanding Quality

Thomson Machine & Tool cuts manufacturing times by up to 30% with EdgeCAM Part Modeler and EdgeCAM Solid Machinist.

Over recent years, it is clear that the market for high quality manufactured metal parts has become increasingly competitive. Manufacturers and assemblers are placing more and more work in low labour cost countries in order to respond to the cost and time pressures placed on them by their own customers. However, as the success of the Thomson Machine & Tool Company Limited illustrates, UK specialist manufacturing companies can still beat the best the world can offer.

Founded 45 years ago to produce parts for diesel engines and generators, the company has developed in the intervening years to become a manufacturer of high quality components predominantly for the aerospace industry. Thomson has responded to the challenges of globalisation through, according to Operations Director Tony Freeman, "...investment in outstanding quality: quality people, quality equipment and quality systems." As a result, Frome-based Thomson predict growth of over 30% this year, they have just increased their manufacturing floor area by some 15,000 square feet and intend to grow staff levels to accommodate future growth. Four years ago, the 44-strong company invested in a six-axis Soraluce SM6000 travelling-column bed-type machine and followed two years later with the addition of a four-axis version of the same machine. With x, y and z axes travels of 4500 x 1600 x 1200 mm, these huge machines are used for the manufacture of large forged titanium engine mount rings for the aerospace industry. The company has also acquired a Mazak Variaxis 630 machining centre with tilting rotary table designed for multiple-face machining. To get full benefit of this high level of investment, Thomson is using EdgeCAM Part Modeler and EdgeCAM Solid Machinist from Pathtrace Engineering Systems.



Fixture design to hold a 'wheel suspension arm' forging

Advancing the company's capabilities

According to Tony Freeman, "It was a business decision to invest in the Variaxis. It's a high speed machine – 12,000 rpm – which we knew would give us the capability to machine the new types of complex components that our customers required, at the machining speed required to keep costs down." At the same time, a prospective customer indicated that they would not supply paper drawings. Instead, it would supply an electronic description of the part to be produced. The company therefore needed a way of inputting the part description, creating the fixtures, and generating the toolpath. Tony continues, "Mazak were really helpful from the outset. They worked with us to develop the initial CNC program for this contract because at that time we did not have the skills needed. We knew that we could not do this for every contract. We really had to recruit someone with the specific skills needed." Simon Turnbull had a background in manufacturing engineering, tool making and production engineering gained initially in his native New Zealand and subsequently in the aerospace industry in the UK. Simon joined Thomson as Manufacturing Engineer specifically to advance the company's capabilities in 3D modelling and machining. Tony Freeman again, "We introduced Simon into the company to fully support what we were trying to achieve. We were in fact already using EdgeCAM, but only at a basic 2D level whilst Simon had almost eight years experience of using Pathtrace software."

Dramatic improvements in machining time

Pathtrace reseller RTJ Systems had supplied Thomson's EdgeCAM 2D Production Machining software and when it came to acquiring additional software, Pathtrace and RTJ was the natural choice. As Fraser Thomson, now in management at the company, says, "Pathtrace software has worked well for us throughout the years, so when we saw that EdgeCAM Part Modeler and EdgeCAM Solid Machinist did exactly what we wanted, there was no need to look elsewhere." The software was installed in November 2003 and Simon Turnbull reinforced his previous experience of Part Modeler with training courses at RTJ. He was soon productive with the software. Simon says, "EdgeCAM Part Modeler enables me to model complex fixtures. The machining part-files are associative to any changes you make in the 3D model, so if the model that we are machining changes, so do the toolpaths. You can also parametrically constrain the fixtures within the model so that any alterations to the part are automatically reflected within fixtures." He continues, "EdgeCAM Part Modeler is

good value for money and easy to use compared to other packages. It complements EdgeCAM Solid Machinist and there are no data conversion problems..." Simon is positive about the benefits of EdgeCAM Part Modeler. He says, "It is hard designing fixtures in 2D. You have to visualise things in your mind. With Part Modeler, you can put the fixtures around the part, bring in tools and make measurements. You can see if the job is feasible before spending time on machine set-up. Off-line planning like this is much more efficient." He says, "I've already been able to make a dramatic improvement in machining time and in tool life compared to the initial program that was developed when we installed the Variaxis."

Tooling costs reduced by 37%

Tony Freeman says, "Before we had EdgeCAM Part Modeler, we spent a lot of time on machine planning. The jobs were somewhat compartmentalised. The turners would think largely about turning, and then pass the part on to the millers who would think about the milling. Fixturing and holding was perhaps not their top priority." He continues, "It's now a much more integrated approach. We look at the task as a whole: how we are going to hold the whole part; what the effects are on the follow on processes as well." He adds, "We no longer have our fixture design done externally. This saves us money and speeds things up, too." Tony points out, "We largely manufacture high value parts that take a long time to machine. Thanks to EdgeCAM, we have cut the time to machine one particular part by 7 hours. We have reduced the cost of machining each component substantially and have also managed to reduce our tooling costs on that job by 37%. Considering the relatively modest cost of EdgeCAM Part Modeler and EdgeCAM Solid Machinist, that is an excellent return by anyone's standards."



Jet Engine Ring machined from recta-linear forging by a VTL

The complete picture

Simon describes one particular job. He says, "We received an electronic 3D model of the required part and a drawing of the raw forging. This was a large steel part weighing 83kg and its complex shape presented extreme holding difficulties. To provide a quotation, we had to know how we would design the fixtures. From the forging drawing, we were able to create a model of the forging in its raw state so we could accurately model the fixtures around it. Then we produced the drawings, including the necessary clamps and nuts and bolts, for the fixture companies to manufacture. We made sure we had enough clearance around the fixtures and that we had any safety and clocking features we needed. We modelled the machine tool table as well as the table clamping for the fixture. That way we had the complete picture. We won the order."

It's a visual thing

Simon clearly believes that EdgeCAM Part Modeler is very easy to learn and use. He says, "If you have any experience of CAD at all, you will pick up Part Modeler quite easily. You simply create the shapes you want and then constrain them with dimensions. You are free to experiment; you can change your dimensions after you have created the shape and it will remodel it for you." He adds, "It's a very visual thing. You don't have to think about dimensions until it is time to make the actual fixture. It takes just seconds to extract a view, and then you can add dimensions to it."

High level of benefit

Tony Freeman points out, "We are under continuous pressure from our customers to reduce our prices. Thanks to EdgeCAM Part Modeler and EdgeCAM Solid Machinist, we can now cut our costs through efficient programming and intelligent production." He adds, "It's helped us gain a competitive advantage to a certain degree. We have more confidence in our quotations because they are more accurate and we are more certain of our capabilities. The time savings we have made have increased our capacity, which means that we have been able to broaden our customer base. In fact, we may well now invest in more manufacturing capacity." Tony concludes, "EdgeCAM was a necessity. It didn't need that much justification and for the high level of benefits we got, it was a very modest investment."



Titanium Jet Engine Mount Ring