



“ It’s all about making a better looking product and with SolidWorks working with CAMWorks the possibility of achieving this is greatly enhanced, whilst at the same time greatly reducing time to market.”

Alan George, General Manager, NSP Engineering

SolidWorks and CAMWorks - a winning combination for designing championship air arms

NSP Engineering (Air Arms) make spring air rifles that set the hunting standard; and competition rifles that win world championships. They are market leaders within the mid-range sector and sell throughout the world through over 35 resellers.

Challenge:

Air Arms wanted to develop a new gun that would give them an edge over their competition. To do this they needed to design something really special.

Surfacing has always been a huge challenge for Air Arms, and their gun components require a mixture of 2, 2.5 and 3 axis tool paths. SolidWorks working together with CAMWorks provided the key to achieve just what they needed, with vastly improved results.

In 1983 neither the airguns themselves nor the industry that produced them could be called hi-tech, but NSP founder Bob Nicholls was determined that this would change with Air Arms leading the way.

In 1988 the decision was made to produce a pre-charged pneumatic rifle and with the success of that decision the company made another very important one - to invest in “computer numerically controlled” production machinery (CNC). By the mid 1990’s Air Arms had fully embraced the tremendous advantages of CNC production technology, expanding and refining its range of pre-charged and spring piston air rifles.

In 2004, Air Arms invested in SolidWorks 3D design software to design the guns, enabling them to enhance the detail, but all the machining was programmed long hand which was time consuming and making small changes was a big thing. So five years ago Alan George, General Manager at Air Arms, started looking into a CAM system to make things quicker and easier. They wanted to be able to put more detail on surfaces to make the guns more elaborate and speed up their processes at the same time.

Alan looked at products such as TekSot, OneCNC and Delcam before finally choosing CAMWorks from UK distributor NT CAD/CAM. The key reasons for choosing CAMWorks were its close association with SolidWorks together with the ability to work with Tombstones.

Tombstone and cube fixtures are vital to Alan’s manufacturing plan as multi parts can be loaded and run un-manned throughout the night. Using the CAMWorks/SolidWorks full integration, Alan can prototype his work as a part and move into full production by using the original program data saved with his prototype. Using this method saves time and prevents re-programming of multiple parts, as the entire cutter path data is saved with the original part. CAMWorks’ assembly mode will allow Alan to visualise the fixtures modelled in SolidWorks, multi load parts either as an assembly or a pattern and most importantly avoid any clamps or fixture furniture

Case Study continued

within the CAMWorks simulation operation. Migrating from part to assembly mode is simple and allows optimisation of tooling and operations with a couple of mouse clicks.

To ensure full use of the tombstone fixtures, Alan could have 200+ components loaded sharing optimised tooling. Aligned with this is the ability to use fixture offsets to keep full control easily on each part. Achieving this control with tooling, offsets and fixtures in CAMWorks is critical and makes Air Arms' ability to manufacture their guns more efficient.

Surfacing has always been a huge challenge at Air Arms but SolidWorks working together with CAMWorks has been key to achieving vastly improved results. Air Arms' components require a mixture of 2, 2.5 and 3 axis tool paths. CAMWorks makes the generation of tool paths simple by utilising the automatic feature recognition for the 2 and 2.5 axis tool paths. This allows Alan full control of the interactive feature recognition to help create the more advanced 3 axis tool paths. It also gives him the ability to contain and avoid areas to stop any over-cutting. By using SolidWorks sketches and feature boundaries, something unique to CAMWorks' intuitive link to SolidWorks, Alan has been impressed by the ease in which he is able to multi datum parts particularly when using assembly mode on tombstone fixtures.

Once designed Air Arms run the design through the Simulation part of the Tombstone software to see whether it is doing what it is supposed to. They then run it through for a second time, this time with Collision detection to validate the design. Providing it has all been set up correctly it is rare that anything unexpected comes up, which has led to greater confidence on the machine shop floor. They are now happy to let it go, knowing that conceptually it will be right, even if it needs a very slight tweak. This has resulted in greatly reduced set up times.

The main time saving process within CAMWorks is the use of Tech DB. CAMWorks' automatic feature recognition (AFR) is unique and will read from a standard Tech database and get machine programmes onto the shop floor very quickly. The more time they spend on adding new improved ideas to the Tech database together with the specific operations and strategies, the quicker their production will become, once the design process has been completed in SolidWorks.

Training, support and implementation are extremely important to Air Arms when making any purchase and having a dedicated CAM professional services team within NT CAD/CAM gave them the confidence they would have all the support and training they would need. Alan George explained that "support is really key and the CAM team have been fantastic. When we're struggling with something we get on the phone to NT, who take the time to sort it so that all we have to do is tweak it. This saves us an immense amount of time."

From a timescale perspective the new gun would not have been designed using old-school methods to generate the surfacing without outsourcing, adding additional time and cost. One of the beautiful things is that internally they can sit and redesign as they go along, modify it, run it through and keep changing things until they are happy with it. CAMWorks in conjunction with SolidWorks has opened their eyes on how they can be more creative with their designs.

CAMWorks has given them an edge over their competition as it has enabled Air Arms to exploit capabilities that their competition do not have. When launched, the review of the gun stated that there was no other rifle on the market to touch this one. It looks fantastic and is so far ahead of everyone else. As Alan George goes on to say "It's all about making a better looking product and with SolidWorks working with CAMWorks the possibility of achieving this is greatly enhanced, whilst at the same time greatly reducing our time to market."

Benefits:

- Close association with SolidWorks
- Ability to work with Tombstones and Cube Fixtures
- Greater design accuracy
- Increased confidence on machine shop floor
- Greatly reduced machine set up times
- Design productivity increased by up to 50%
- Given them an edge over their competition with a better designed product.
- Greatly reduced time to market.



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