

# Cutting edge

**T**oday's complex oil and gas drilling programmes demand innovative downhole solutions. The precision machining of manufacturing equipment for this industry sector demands that the cutting process be as efficient as possible. So, it is imperative that machine crashes that could ruin the part, damage the fixture or break the cutting tool are minimised. To achieve this, National Oilwell Varco (NOV) ReedHycalog uses simulation software from CGTech that eliminates the need for physical prove-outs on complex CNC machine tools.

NOV ReedHycalog is a division of National Oilwell Varco and primarily design and manufacture Fixed Cutter and Roller Cone Drill Bits. At its Stonehouse, Gloucestershire facility the company has been using Vericut for over a decade, and it is now an essential component within its engineering systems. Currently there are 11 users on site sharing four floating licenses.

## Technology

Matthew Tolner, senior production engineer, explains how the company chose to use Vericut technology: "Back in 1998, when Vericut was selected, five per cent of the production of steel drill bits were new prove-outs. Typically, the prove-out times were taking twice the time of a proven job. Back then, the average cycle time for a proven job was 15 hours."

CGTech's Vericut software removes this potentially hazardous stage by allowing NOV

ReedHycalog to do all of its prove-outs off line on a PC. This provides significant results on the shopfloor and Vericut was initially chosen over other simulation software systems due to its superior optimisation, particularly its optimisation of 5-axis programs. The majority of the programs are for 5-axis machining centres and are extremely complex.

A distinct advantage of the Vericut system is the way in which it cuts down CNC cycle times. "All new 5-axis and 3-axis G code programs are run through Vericut to check for machine and tooling collisions, dimensional tolerances and cycle time checks prior to being made available to the shopfloor," continues Matthew Tolner. "Currently this equates to approximately 150 programs per year with an average cycle time of five hours. Although we had previously used the optimisation to remove fresh air passes, this is no longer done due to improvements within the CAM system."

## Production

Vericut has helped NOV ReedHycalog to adopt a right first time approach. This has in turn led onto production being able to schedule multiple numbers of brand new components which enables the company to meet its product delivery matrix.

Having taken the opportunity that multiple setups functionality offers, including verification of turning programs, previous single machine Vericut user files have been replaced by multiple machine single project files. The ability to have multiple sets with one project enables NOV ReedHycalog to effectively load what used to be several separate files into one project file. The ability to auto load one cut stock model from one set up directly into the correct location in the sequential setup reduces the file creation time and also the run time.

With all programs simulated and



proven using Vericut prior to release to the shopfloor, on the machine prove-outs are a thing of the past. This coupled with reduced risk of workpiece, tool, and machine damage results in significant cost reduction. Additional cost savings are achieved through the reduction in the number of tool breakages resulting from collisions.

## Software

Vericut is a very stable piece of software and is regarded as one of the most robust NOV ReedHycalog uses. Regular upgrades are available to constantly improve existing programs and provide additional functionality. "Although the licence cost is significant the time saved by not having to prove programs on the machine coupled with negligible scrap or rework cost make Vericut an essential part of our engineering systems," concludes Matthew Tolner. ■

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