


Enztec

How Enztec Reduced
CNC Cycle Time by 16%
Using Vericut Force
Optimisation



User Story



This case study explains how **Enztec**, a New Zealand manufacturer of high-precision orthopaedic surgical instruments, used Vericut Force force-based optimisation to cut CNC cycle times by **16%**, stabilise unattended machining, and free **more than 1,800 hours** of annual machining capacity; all without adding machines or labour.

Key Results Snapshot

- **16% average reduction** in CNC cycle times on optimised programs
- **1,800+ hours** of additional annual machining capacity unlocked
- **More consistent tool wear** and confidently defined tool life
- **Reduced risk** during lights-out and unattended machining
- **Faster programming confidence** through accurate machine models



Company Background

Enztec designs and manufactures high-precision orthopaedic surgical instruments for many of the world's leading medical-device companies.

Based in New Zealand, we operate in a highly regulated environment, producing both reusable and single-use instruments. In our world, machining accuracy, surface finish, and dimensional repeatability are not nice-to-haves, they directly influence product performance and patient safety.

To keep pace with growing global demand, we have continued to invest in advanced CNC machining, automation, and unattended machine operation.

As these systems evolved, one thing became clear: raw productivity on its own was not enough. We needed greater predictability and confidence in how our tools and machines behaved in real production conditions.

The Manufacturing Challenge

In automated and lights-out machining environments, unexpected tool wear or failure quickly becomes a risk to quality, safety, and output.

Traditional CAM systems are very effective at generating toolpaths. However, they do not fully account for the real cutting forces and engagement

conditions that occur during machining.

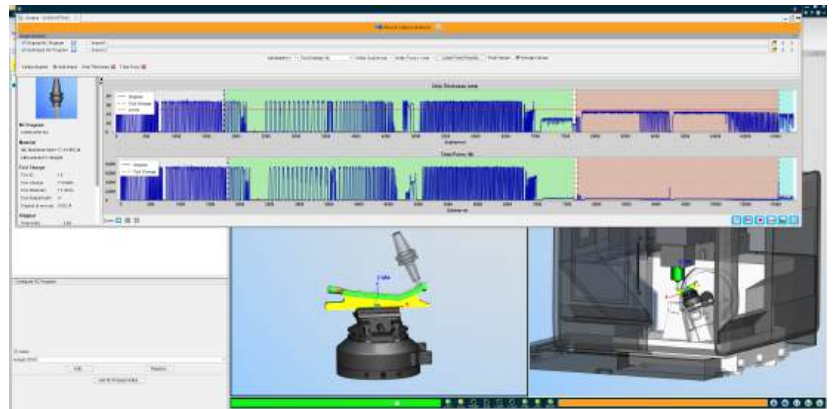
In practice, this gap often leads to conservative programming or time-consuming manual fine-tuning on the machine. Tools are protected, but productivity is left on the table and uncertainty around tool life remains.

That uncertainty matters even more when machines are running unattended. Our goal was to improve cycle times while also creating machining processes that were stable, predictable, and suitable for extended unattended operation.

The Solution: Bringing Physics Into the Programming Process

To close that gap, we introduced Vericut Force into our programming and verification workflow.

Rather than relying purely on CAM assumptions, Vericut Force simulates the real physics of the cutting process. Using actual tool geometry, material properties, and cutting conditions, it calculates cutting forces, engagement, heat generation, and chip formation throughout each toolpath.



Instead of applying a single feed rate or defaulting to conservative safety margins, the software dynamically adjusts feed rates to maintain a consistent target cutting force and chip thickness.

Where engagement is light, feeds increase to make better use of machine capacity. Where engagement rises, feeds are reduced to avoid force spikes and excessive tool loading. The result is machining programs that are not just faster, but far more stable and predictable.

Implementation: Making Verification Match Reality

One of the most important parts of our Vericut implementation has been ensuring that our machine models accurately represent our real CNC machines.

Modern machining centres can be configured in many different ways. Small differences in kinematics, limits, and control behaviour can meaningfully affect how programs run in practice.

Fine-tuning these models has been essential to building confidence in

both the machine simulation and verification results and the force-based optimisation that follows.

As **Jack Greaves, Process Improvement Engineer at Enztec**, explains:

“The support we received from our local Vericut agent, AxsysCNC Limited, was excellent and really helped us get the software into use rapidly, while also enabling us to quickly fine-tune the models so they were accurate and truly representative of our machines.”



Measured Results on the Shop Floor

By applying force-based optimisation to our repeat-running production programs, we have seen consistent and measurable improvements across our machining operations.

On average, we have achieved around a 16% reduction in cycle time on optimised programs, while maintaining stable cutting conditions and predictable tool behaviour.

Over the course of a year, these improvements have translated into more than 1,800 hours of additional machining capacity effectively increasing output without adding machines or labour.

Equally important has been the improvement in tool life consistency. By controlling cutting forces and chip thickness, tool wear is far more uniform.

That uniformity allows us to define tool life with confidence and significantly reduce the risk of unexpected failures, a key requirement for unattended machining.

Leadership Perspective

Reflecting on the early impact, **CEO Iain McMillan** notes:

“We rapidly saw positive results and impactful changes in how our CNC programs were running in our production environment. Reviewing our production data, it is very clear to see the impact that this software has had, and the cumulative savings we will continue to make.”

From a capacity perspective, the benefits have also been significant.

Laura Hill, COO, adds:

“Beyond the dollar savings from reduced cycle times, the Vericut Force software has already freed up capacity internally, which helps reduce the need for additional capex as we keep up with our growing customer demand.”

Looking Forward

For us at Enztec, force-based optimisation is now a core part of how we approach CNC programming and process development.

It has helped us move away from conservative assumptions and manual trial-and-error toward data-driven, predictable machining processes that support automation and long-term scalability.

As we continue to expand our use of unattended machining and increase production volumes, confidence in tool behaviour and process stability will remain just as important as improving cycle times.

Vericut Force has become a valuable tool in supporting that approach — and a foundation we will continue to build on as we scale.

