

Case Study - CAD Comparison

5ax Laser Drilling - CAD Comparison - A client with a 5-axis CNC laser drilling operation programmed with an existing SURFCAM 5-Axis CAM system needed to import manually-doctored CNC code and compare the "as-is" version from the CNC machine with the original "as-designed" CAD model to determine if a refurbished component was still within acceptable tolerance. Their CNC operators were making slight position adjustments at the machine using a closed-circuit TV using with a magnifying lens for opening up welded tiny cooling holes in airfoil surfaces of jet engine components.

Our solution (created in less than a week after receipt of detailed specs) allows the SURFCAM programmer to browse and import a CNC code file containing thousands of holes, converting 5-axis machine positions into point & vector geometry in model space in a few seconds.

CHALLENGES:

Automatically skip over non-pertinent CNC blocks.

Convert from machine coordinates to model coordinates.

High performance - convert thousands of holes in a few seconds.

Honor NC register modality.

DESIGN GOALS:

Our customer wanted the following capabilities:

- (a) Process directly from a hand-edited 5-Axis CNC code file as it came from the CNC with no prep work.
- (b) Create points at each drilled location and a line pointing in either direction to allow inside vs. outside comparison with the CAD surface model.
- (c) Create the points and lines on separate layers so they could be easily manipulated.
- (d) Color-code points and lines clarity.

SOFTWARE COMPONENTS:

The "System" we developed to meet these goals consists of a simple AddIn from the standard File|Open menu that automatically reads the file, skipping over NC blocks that aren't geometry-related. In addition, some NC blocks had incomplete (missing X or Y or Z or C or D information) because they were manually inserted into the NC program by the operator. In this case, the System assumes a modal condition whereby the previous values are used.

Since in production, this System (our client's Secret Weapon) is flawlessly producing upwards of 1,500 points/job in a few seconds - a labor-intensive task that had been taking 4-8 hours per job.

