



## Cleveland Motion Controls Multi-Axis CNC Machine - Cladding Application

### APPLICATION - BACKGROUND SUMMARY

Huffman HC205 5-axis Cladding Machine performs Z-Notch and Seal powder fusion welding on shrouded turbine blades in place of manual welding.

Laser Powder fusion permits the deposit of layers of metal onto the surfaces of complex components with a minimum of heat transfer. Huffman's laser system combines a stream of powdered metal with high-energy laser. As the metal is melted by the laser beam, it is layered onto the surface being repaired in a process known as cladding.

The Huffman Open Architecture Control (OAC) system integrates CNC motion control and machine interface logic with a vision system to create a program path for the Laser powder fusion operation.

### THE PROBLEM

Huffman was faced with replacing existing control logic software that was obsolete and unsupported. The FALCON control logic software was used to develop the machine interface for their CNC Multi Axis Machines.

### CLEVELAND MOTION CONTROLS SOLUTION

The FALCON software provided the best solution by maintaining the existing machine interface with minimum changes required. Falcon software was installed in place of the existing software. The logic files were imported from the old software. The configuration files were created to support the machine input/output.

The Falcon database provides the interface between the machine input/output, CNC motion control system and Autoclad programming system with integrated vision camera.



*"FALCON IEC 61131-3 software provides tools for developing three types of logic, Sequential Flow Charts (SFC), Structured Text, and Ladder Logic. The ability to combine all three types of logic enables the control engineer to create the best possible design that is easy to troubleshoot."*

-Mr. Jim Alfors, Retrofit Product Manager, Huffman Corporation  
[www.huffmancorp.com](http://www.huffmancorp.com)

The Falcon software currently supports Windows XP and has planned support for future Windows operating systems.

The FALCON IEC 61131-3 Logic Control software provides the logic interface between the machine and the PC by controlling the I/O (via Profibus). The Falcon software enables Huffman to design the logic to control the various interface components on the operator's panel, powder feeder, door switches, lighting, lubrication system, exhaust and numerous other machine functions. Each function is controlled by a separate Sequential Flow Chart (SFC).

The Falcon software database provides data sharing with other Huffman software applications including CNC motion control using Delta Tau motion control hardware and cladding software. The cladding

software incorporates a vision camera to capture images of the part to automatically create part programs. The part programs provide the tool path to perform Laser powder fusion welding for various applications such as Z-Notch and Seal Welding on shrouded turbine blades.

### WHY FALCON WAS CHOSEN:

Huffman Corporation made the decision to move forward with FALCON because they realized:

- Ability to import files from the obsolete control logic software
- Familiarity with IEC 61131-3 standard
- Built in database
- Future Software support
- Easy Interface to other Huffman Software Applications