
Case Study - Database-Driven CAM

This programming system was created for automatic CNC data generation for any mixture of simple parts on a multi-part palletized machining center. Our customer had purchased multiple pallet-mounted custom fixtures, each able to handle any mixture of the three blank sizes that span their entire parts inventory. They needed a web-enabled database-driven system to automatically compute CNC programs in 9-part batches from stored profiles for roughly 1,000 unique part numbers.

CHALLENGES:

Simple touch-screen interface enabling a production worker with little or no prior machining experience to immediately produce a high-volume of output.

Automatically optimize loading of the most efficient batches onto a pallet.

Work directly off a remote database with no CAM software involvement. This involves totally automated manipulation of tool numbers, work offsets, and subroutine numbering to minimize travel and tool changing.

Efficient exception handling and problem reporting of broken tools, secondary tools when tool life parameters are exceeded, mis-aligned parts, pallet malfunctions, and defective castings.

DESIGN GOALS:

Our customer wanted the following capabilities:

- (a) Process directly from an Internet-resident master ordering database.
- (b) Automatically compute optimized batches from an incoming work-order DB table.
- (c) Conveniently handle custom shapes without lengthy setup or pre-programming activity.
- (d) Optimize tool selection of multiple tools for rough, finish, and engraving functions.
- (e) Automatically engrave part numbers at pre-defined offsets from part edge.
- (f) Automatically provide up-to-the-minute production statistics for management.
- (g) Allow Management to re-prioritize work flow at any time.
- (h) Touch-screen user interface for operator wearing gloves.
- (i) Automatically invoke sister tooling when primary tool life is exceeded.
- (j) Provide backup, redo, and recovery techniques in the event of a broken tool.

SOFTWARE COMPONENTS:

The "System" we developed to meet these goals consisted of a web-enabled program that can be simultaneously accessed by Management, the Operator, Order Entry, or any other Operational personnel.

Once in production, this System is flawlessly producing upwards of 2,000 parts on a single 8-hour shift tended by an unskilled CNC operator. The operator interfaces with the System entirely via a color-coded touch screen except to log messages for unusual occurrences or to call for assistance.

