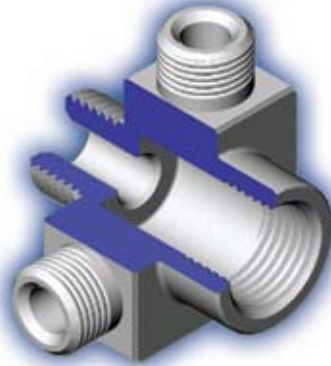


GibbsCAM[®] MTM CNC Programming for Multi-Task Machining



Multiple spindles. Multiple turrets. Material being machined in multiple stages, transferring from spindle to spindle without handling. Stock inserted at one end, finished parts coming out the other. Multi-Task Machining (MTM) is the fastest growing machine tool segment today and the most demanding. Realizing the ultimate level of utilization from these MTM-class machine tools requires a CAM system that is capable of functioning and thinking exactly like an MTM-class machine tool. GibbsCAM MTM was specifically designed to address the CNC programming requirements of MTM, providing powerful programming tools that are easy to learn and use.

Because MTM-class machine tools are constantly evolving with infinitely variable configurations, GibbsCAM MTM was designed with the ultimate in flexibility and configurability. Starting with a base machine tool definition, bar feeders, parts catchers, turrets, sub-spindles and other machine options are added. The necessary level of machine modeling is provided to support the customer's exact machine tool configuration right down to the device-specific cycle times and NC code. Tooling is defined, located and oriented on the machine tool using GibbsCAM's graphical interface. Fixed and live tooling, as well as form tools, are supported. GibbsCAM MTM is like having a custom programming system for each MTM machine tool.

Local coordinate systems are pre-defined by GibbsCAM MTM for each spindle to facilitate defining geometry for turning (ZX plane, including -X cuts), OD or B- or C-axis rotary milling and cross drilling (YZ plane), face milling and off-center drilling (YX plane) and back facing. CAD part geometry, including solids, can be imported using GibbsCAM's data exchange options, which support reading a wide variety of CAD formats. Geometry can also be defined interactively or using imported CAD geometry as a reference point.

Machining processes are easily defined with GibbsCAM's intuitive graphical user interface that provides seamless access to both turning and milling capabilities. Processes can be defined as a single serial sequence and then analyzed using GibbsCAM MTM's Sync Manager, a graphical tool which displays the program's multiple flows and their processes. The Sync Manager handles the time-dependent aspects of the program, managing all the details that are introduced when multiple tool groups are cutting simultaneously. Using the Sync Manager, it is easy to move operations around in the overall flow to minimize non-cutting time, and control parallel operations by placing synch relationships wherever needed. And GibbsCAM's associativity allows operations to be updated easily when modifications are made.

At any point in time while developing the CNC program, the machining process can be graphically simulated and visually reviewed. Tool/tool, tool/stock and stock/stock interference can be detected allowing program errors to be corrected before it wastes material or damages tooling. The Machine Simulation option provides full machine component animation and collision checking, providing a powerful environment for program optimization.

Recognized as one of the most powerful post processing capabilities available, GibbsCAM's factory-supplied post processors output multi-flow NC code complete with utility operations and sync codes. Guaranteed error-free/edit-free, what-you-see-is-what-you-machine NC code is generated, ready to run on the machine tool and produce good parts.

GibbsCAM MTM is divided into three configurations based upon machine and NC code complexity. Each level is based on the possible number of parallel actions, or “flows” (each a separate column in the Sync Dialog). Level I targets basic MTM devices with a single flow. This includes machines with a single turret, sub-spindle, B-axis, and auxiliary devices such as bar feeder, parts catcher, and tailstock. Level II adds support for two flows; typically twin turret/twin spindle machines. Level III is specialized for MTM devices with more than two flows.

Machine Definition

- **Machine characteristics**
 - Unlimited number of axes, spindles
 - Unlimited number of turrets, gangs
 - Unlimited number of flows, channels
- **Available utility operations**
 - Load, Unload Spindle
 - Part Shift
 - Part Catcher In and Out
 - Sub-Spindle In and Return
 - Tailstock In and Out
 - Move Turret
 - All Stop and Machine Mode
 - Steadyrest In, Out, Position

Load Spindle and Part Shift support Manual Chuck, Auto Chuck, Bar Feed, Auto Bar Feed, Bar Pull, Sub-Spindle Pull and Robot. Unload Spindle supports Manual Chuck, Auto Chuck, Part Catcher, Part Gripper, Part Drop, Pushout, and Robot.

Tooling Definition

- Assignment to tool group, turret, slide
- Gang tooling – multiple tools, one location
- X+/X- spindle side
- Full control of insert orientation/setting
- Tool tile displays extended tool data
- Sort tools by tool group
- Tool Sup-positions (flash tools)
- Easily move tools between turrets, automatically updating operations

Geometry Definition

- **Auto-initialization of spindles’ coordinate systems**
 - ZX for turning
 - YZ for OD or rotary milling and cross drilling
 - YX for face milling and off-center drilling
 - Y-X for back facing and off-center drilling
- **Viewing control**
 - Spindle-oriented display control
 - Unzoom only frames display control
 - Home view displays current spindle as single spindle

Process Definition

- Create, save and combine powerful MTM processes
- Work-in-progress stock auto-initialized for subsequent spindles

- **Pinch Turning processes automatically split roughing operations into 2 or more tools**
- **Utility Operations (typically non-cutting)**
- **Sync Manager**
 - Displays parallel process flows
 - Automatically calculates operation times
 - Automatically checks for invalid operations or syncs
 - Operation tiles sized by duration
 - Displays can be expanded/compressed
 - Multiple display modes
 - ◆ Sync mode
 - ◆ Op mode
 - Mirrors operations list
 - ◆ Spindle mode
 - Facilitates inserting synchronization points in process
 - ◆ Start-to-Start
 - ◆ Finish-to-Finish
 - ◆ Start-to-Finish, Finish-to-Start
 - ◆ Delay offsets
 - Stroke-level synchronization
 - ◆ Ensures start/end of tool group stroke matched with another
 - ◆ Auto-adjust federate to finish together
 - ◆ Definable dwell per tool group

Process Validation

- **Cut Part Rendering**
 - Extruded polygonal stock shapes
 - Optionally display tool holder
 - Displays elapsed time
 - Simulation control
 - ◆ Stop at all part transfers
 - ◆ Stop at specific operation
- **Single spindle with multiple tools**
 - Isolate display to one flow
- **Automatically initializes work-in-process stock across multiple spindles**
- **Machine Simulation (extra option) provides full machine component animation, collision checking, and program validation**

Post Processing

- **What-you-see-is-what-you-machine, edit-free posts**

MTM machine tools are expensive and complex, requiring optimized programs to realize maximum productivity for high volume, high quality parts. In order to maximize your MTM machine tool investment, you need an NC programming system that complements and leverages it. With GibbsCAM MTM, your satisfaction is unconditionally guaranteed. Pick the best and forget the rest.



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