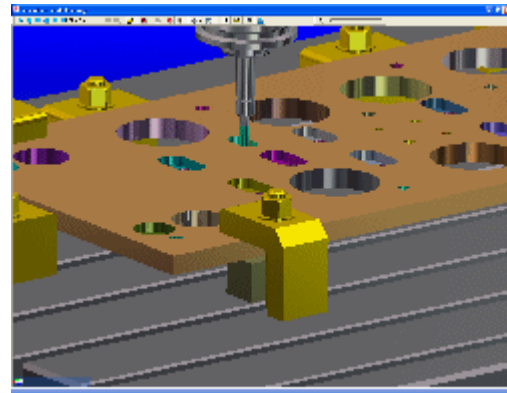


## Investing in CAM for Mold & Die

For many years, mold makers like many other small and medium sized manufacturing companies, enjoyed the luxury of their customers and competitors being within a 50 mile radius. This meant that the cost of doing business was reasonable, and the chances were they knew their competitors well.

Today, the situation is quite different. While many mold makers still have local customers, their competitors are worldwide. Specifically for North American mold makers, the competitors are now located in several European and Asian Countries.

This competitive threat, particularly from countries with lower labor rates, has forced a number of mold makers out of business, and the remainder to take a fresh look at their manufacturing processes. The requirement to seek out opportunities to reduce costs and delivery times, while retaining the level of service and quality they have historically provided has become a matter of survival.



Advances in tooling, machine tools and work-holding have helped. Additionally, adopting a culture that was previously more commonly found in a high production machining environment (where shaving minutes or even seconds from an operation is valuable) is becoming the norm.

With respect to CAM software, most shops now have some brand of 3-axis machining software, considerably reducing the time it takes to program even the most complex cores or cavities. Improvements to CAM software in recent years have made the toolpaths more efficient and reliable, reducing the actual machining time significantly.

The leading CAM companies continue to invest in making software easy to use. This doesn't just mean a pretty Windows® compliant user interface. CAM is a complicated process with a multitude of different strategies and options available for every operation. Any CAM software selected should make it easy to generate robust, reliable toolpaths first time by reducing unnecessary clutter and guiding the user through the machining process while giving a high degree of control over the toolpaths generated.

However, in the area of programming, many shops still overlook two key

areas for significant productivity gains. These are data translation and the automatic machining of mold plates.

For years, the standard for data translation was IGES, but many shops can now pass solid CAD data from engineering to manufacturing. Native files from CATIA®, or industry standard modeling kernels such as ACIS® or Parasolid®, contain a lot of useful information that can radically reduce programming time. For instance, a solid model of a plate, will contain not just the hole centers, but also their diameter, depth and any chamfer or countersink information. Solid-based CAM software can quickly use this information to create toolpaths. For those shops that can't pass solid CAD data, there are CAM solutions that can create a solid from surfaced IGES files.

An extension to this is Knowledge-Based Machining (KBM), where the CAM system learns how the programmer prefers to machine a component or particular feature.

KBM can apply the best machining practices consistently, drastically reducing programming times, and eliminating errors. The latest innovations in KBM use graphical flowcharts to define the required machining strategies and utilize non-geometric information (such as thread data) directly from the CAD model. This is a long way from the manual programming techniques still employed at many shops today, where drawings with hole centers hang from magnets next to the machine!

With faster programming of mold plates, some shops now use tombstones, upon which 4 or more plates can be mounted for machining. A single toolpath utilizing multiple tools can be generated to include all spot-drilling, drilling and tapping operations. Pockets or "d-locks" can also be machined directly from the model. The toolpath can be optimized to machine all the plates by tool, tool priority or particular face of the tombstone.

To summarize: CAM for Mold and Die is not just about machining the core and cavity. Automating the machining of mold plates offers more potential for significant productivity gains than perhaps any other aspect of programming in helping North American mold makers compete on a global basis.

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