

Mainland Machine pallets loaded with parts before and after machining.

CAM SOFTWARE HELPS MAINLAND MACHINE **INCREASE SPINDLE TIME** FROM 15 TO 30 HOURS PER WEEK BY EFFICIENTLY PROGRAMMING FOR THEIR CUSTOM FIXTURES

By Jerry Fireman

In order to stay competitive in the current economic climate, Mark Ames, owner of Mainland Machine, set out to drastically increase the company's spindle run times. This was accomplished by finding a CAM system that was capable of maximizing the benefits of several new strategies being implemented.

Founded in 1983 by Ames, Mainland Machine has grown to include a group of highly talented staff capable of supporting its customers' goals from concept to finished product. Located in San Luis Obispo, California, Mainland Machine provides a host of services including, but not limited to, manufacture, assembly, laser engraving and product design. Ames attributes Mainland's success to his company's ability to work with the customer to develop complex products

that are both functional and cost effective to manufacture at the very high level of quality demanded by the end user. "At Mainland we do not just make parts to a print and hope it all works out," Ames said. "We work with the customer to understand their needs by either assisting with or providing the product design."

In the past, Mainland was able to support its customers' needs using tried-and-true methods such as machining several parts one side at a time in multiple vises on their 17 Fadal 3-axis VMC's. Although this method worked for many years, it limited spindle time to about 33% efficiency because a large percentage of the parts that Mainland machines are relatively small and the tool is only in the cut for a short period of time. This method required the spindle to stop far

The most powerful *CAM software* ever.

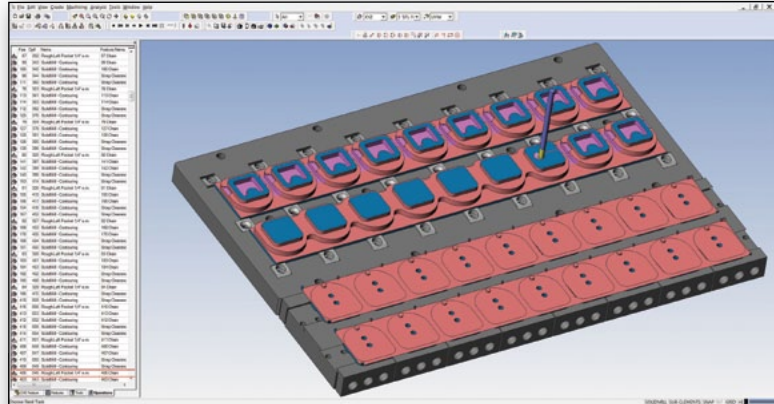
too often for part change and tool changes.

Realizing the need to increase spindle times to stay competitive, Ames upgraded some of his VMC's with pallet changers, and added two 5-axis mills and three lathes (two with sub spindle mill turn). The two 5-axis mills and the two sub-spindle lathes allowed Mainland to reduce set-up time on the more complex parts that had required three or more set-ups while the pallet changers allow the machine to run when the operator is preparing the next pallet.

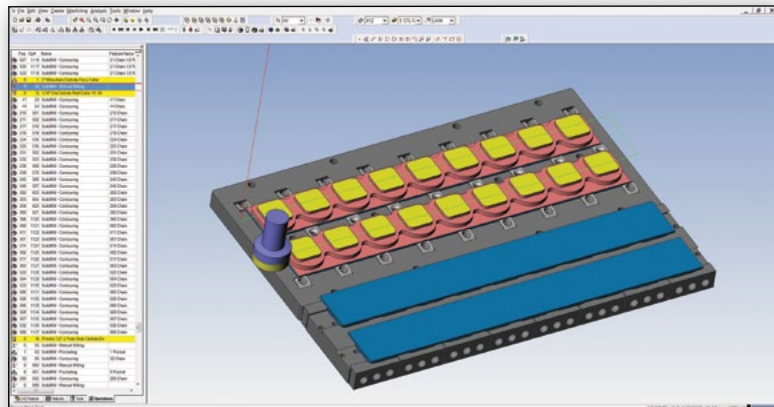
In order to maximize the full potential of the pallet changers, Ames started designing custom fixtures that could hold the material in a manner that would allow the machine to perform multiple operations on multiple parts. For example, a part that requires two operations could be machined in a fixture holding four rows of ten. The first two rows could be operation 1 while the next two could be operation 2. Therefore each time the operator performs a change-out there will be twenty completely machined parts. The pallet changer allows the operator to load parts onto one fixture while the fixture in the machine is being processed. This method made it possible to increase spindle time significantly. However, it was discovered that Mainland's current CAM system was only capable of generating code that would either machine multiples of the same operation or code that would machine all of the first operation, then the entire second operation, and so on. The latter requires many redundant tool changes that waste valuable spindle time.

"DP Technology's ESPRIT CNC programming software overcomes both of these difficulties by enabling me to program multiple offsets on a fixture containing multiple views of the part or even multiple parts and also to efficiently program operations on more than one part in the fixture," Ames said. "ESPRIT helps me take full advantage of my custom fixtures with the result that I have been able to more than double spindle time to 75%, dramatically improving the profitability of my business."

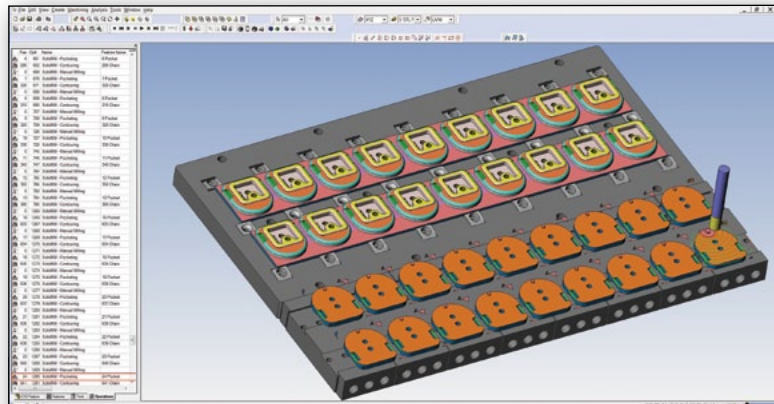
After evaluating several of the top CAM



An ESPRIT simulation of Mainland Machine's pallet system with two set-ups.



After simulating set-up one, an STL file is saved and used as stock for set-up two.



With both set-ups programmed, the operations can be reordered to minimize tool changes.

The most powerful *CAM software* ever.

systems, Ames determined ESPRIT was the only software that could effectively take full advantage of all the upgrades Mainland had put into place. Most important was the new fixture system. ESPRIT's ability to easily create multiple fixture offsets and then organize the tool path so that each tool cuts all that it can before moving on to the next tool made it the only choice.

Yet another important aspect of this type of programing is the ability to verify the program before it makes it to the shop floor. "In this respect ESPRIT is second to none due to its phenomenal simulation capabilities," Ames said. "ESPRIT simulation is so good that you can see blemishes as small as 0.0001", such as when a tool does not blend properly with the material left by a previous cut. ESPRIT also provides simulation of multiple parts so that you can see if you accidentally gouge the part next to the one you are working on. Time and time again I write programs that require absolutely no editing on the shop floor. I have never been able to do that with any other software package."

"I found ESPRIT considerably easier to use than our previous software," Ames said. "The way ESPRIT automatically creates work planes simplifies the programming process considerably on multi axis work. Having the ability to create the tool path operations and then organizing them afterward allows the programmer to focus on programming while not having to worry whether or not the operations are in the right order."

After seeing the advantages of running parts in fixtures verses vises Mainland has purchased two new Mori-Seiki NH5000DCG horizontal machining centers with 240-tool ATC's each and has plans to purchase a 24 station pallet pool to support them. Ames was able to make this substantial purchase with confidence knowing that he can apply his custom fixture technology and Esprit programing to this system to achieve 24/7 machining. "ESPRIT has played a crucial role in our company's use of custom fixture technology to substantially improve the productivity of our machining operations," Ames concluded. ■

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-- Mark Ames, Mainland Machine



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