



O&Omdc
Ophthalmic & Orthopaedic
medical devices consultant

“Nothing generates more value than innovation...”



From Jim DRAIN



I appreciate being asked to write a column for the inaugural launching of the “O&Omdc” Web Site. There is, over the years, going to be a lot of useful information disseminated to the world of Intra Ocular Lens Production through this medium.

I have known Patrick for many, many years. He has a wealth of knowledge and a very fertile mind for problem solving. I have worked with him for all those years creating systems to meet his (thus his customers’) needs.

One of those innovations came in the very early ‘90s when our 4 Axis lathe, termed “Tom and Jerry” because the electronics package was separate from the lathe, caused a floor space problem. His question, “can the 3 axis lathe that is very popular for making contact lenses be made into a 4 axis lathe for making IOLs?” The answer was YES and the DLL Series III/4 Axis Compact Lathe was born. And the first one went to the company he worked for and is today still turning lots of IOLs. A side note, the 4xC became the preferred lathe not only for IOLs, but also for contact lenses. The fourth axis made possible two very important features: 1. It turned a complete edge radius and 2. With lots of software development, fly cutting toric lenses became a reality. Flycutting torics had been done before, but that process was very laborious. The 4xC made it easy.

Another great idea was discussed with Patrick 10 years ago. How about making a lathe and mill combination?! We all pondered that possibility and decided it would be better for IOL laboratories to have 2 lathes and 1 mill per manufacturing cell. This has been true until recently. What changed?

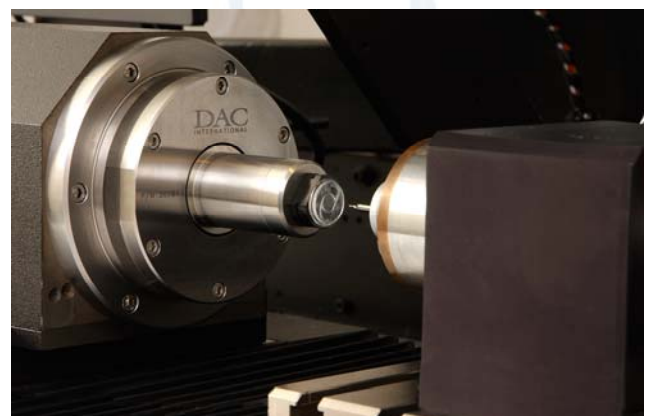
Well, several things:

The DAC DLL Series IV/2 Axis ALM lathe was introduced and accepted. Then one customer wanted 12" (300 mm) X travel instead of 8" (200 mm) so we make all ALM lathes with this extra travel and large T-slot tooling plate. This provides room for the tooling including: Precision switch touch probe, a LH roughing diamond, the straight controlled waviness finish diamond, a special diamond for making square edge IOLs, a high speed 15 to 160k rpm milling spindle and if torics or non-rotationally symmetric designs are needed, the OTT tool. The Oscillating Tool Technology (OTT) can be added in the field if it is not thought to be needed initially.



Now suddenly, a lathe/mill combo makes real sense. The optimal manufacturing cell is now two (2) DAC DLL Series/IV MLC machines. With the advent of hydrophobic materials that require freezing during turning/milling this makes the perfect platform. Another big advantage is only one manufacturing platform for manufacturing personnel to learn and master, not two. All the same easy to use software is standard. A new customer is trained in a week to fully utilize the new machine; the returning customer does not have to learn anything except how to properly maintain this new technology.

Now back to hydrophobic material – we offer the AMCC freezing system as an option. One model fits on the spindle nose and will freeze a button to their especially designed arbour in about 10 seconds. Once the button is frozen in place, turning and milling is accomplished. Then the switch is thrown and the button is thawed, ready to be turned and frozen for turning of the second side. This process is very labour intensive.



But if automation is added to this system most of the labour input is eliminated. There are two ways of automating that have proven very successful:

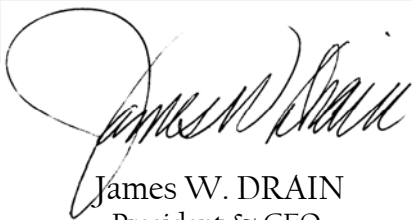
1. BENZ Research and Development offer a complete automation package including robots, complete management and control software and a most impressive optical blocking system. The blocker is accurate to less than 1 micron. In a calibration mode,

a surface can be turned to a radius then moved to the blocker for inspection. If the radius has drifted the blocker sends a signal to the lathe to correct the lateral position. The software system tracks each order, via bar code reader, from order entry through manufacturing to shipment. For larger laboratories, this is a fine system to consider.

2. DAC offers a Universal 1000 Autoloader mounted to the 2 Axis MLC. Depending on the size of the arbour or blank, between 500 and 1000 parts can be loaded, turned, milled – all unattended. The ‘lights out’ approach to manufacturing assures repeatability and quality while reducing labour content.

Now with an AMCC system added to the automation, freeze blocking can be done automatically. In either case, an IR sensor is closed-loop on the air valve to maintain proper temperature during machining.

For manufacturing IOLs whether PMMA, acrylic or hydrophobic, this system offers a very cost effective solution.



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