



Cheap Can Be Very Expensive

by Nick Hart and Dan Dickey | Innovative Peening Systems

A value comparison between industrial Computer Numerical Control (CNC) and Personal Computer (PC)-based control

An alternative to CNC are PC-based numerical controls. PC systems are often priced significantly lower, but claim the same level of accuracy and dependability as dedicated CNC controllers. However, before you go the cheap route for a shot peening machine motion controller, consider some important points.

Stability

CNC controllers have developed a very stable platform. There are literally thousands of these controllers sold every month. Even the latest CNC controllers have been through many years of design adaptations, making them extremely dependable. Time between controller failures is measured in decades. For example, a leading manufacturer has a measurement of 27 years MTBF (Mean Time Between Failures) for their controllers. Ratings for most PC manufacturers would be a guess since they've not been on shop floors for extended periods and many are new and customized programs.

Support

A PC motion control developer creates a program based on the latest Microsoft operating system. That's the first problem: Microsoft doesn't develop their operating systems for industrial machine control; they are designed for office and home applications. The next issue is that continued support for PC-based systems is beyond the developer's control—it's possible only as long as the operating system functions in the same way as when the product was developed. And nothing is worse than looking for the guy that wrote the program who is no longer in business.

Most of us have felt the pain of operating system (OS) updates, from XP to Vista, then back to Windows 7. PC-based controllers ride on the backbone of the OS installed on the PC. Once the OS is updated, the application may perform erratically, unsafely, or not at all. In addition, PC users have hardware and applications that won't run on the newest types of processors, or the hard drive installed in the PC is no longer manufactured. These problems cause system downtime while an entire system is upgraded because of one component failure.

CNC systems don't have this problem as the software was specifically designed with the control system in mind and it's supported by the manufacturer of the controller. It's easy to find reliable support in the CNC industry. A good example is Fanuc FA America. They provide 15-year afterlife support on all CNC controllers. That means that 15 years after the product has been discontinued, Fanuc will have replacement parts for the controller.

Compatibility

The internal operating system of a PC system is designed for general purpose computing and the potential for conflict among the CNC components and software is real. A system lockup from a conflict is devastating when it causes a machine tool to lose its controller.

CNC systems are just that—a system of controller, amplifiers, cables, I/O, servos and spindle motors that's built for longevity. CNC controls are specialized computers which often use the same main processor as a PC, but its sole purpose is to control machinery. The design incorporates safeguards at the hardware and software level to detect problems and to stop the machine if an error is detected. Since features are specifically designed for that control, system conflicts are virtually non-existent.

PCs use a single high-speed processor to perform the majority of the tasks required by the software. This means that not all of the machine's critical functions can be monitored simultaneously. The processor must share some percentage of the time monitoring the servo positions and speed, scanning the control logic, handling operator input, updating displays, plus manage its own internal housekeeping. Although the fast speed of the processor can minimize the time that functions are left unchecked, many control functions are ignored at any given time.

CNC controls use multiple processors to control each aspect of the system. Peripheral request or machine functions can be done at a sub-system level without interfering with other processors. CNC controls utilize digital technology with servo drive systems, resulting in higher accuracy and speed.

There's Always a Bottom Line

From a capital standpoint, PC controls may be cheap but they could get very expensive later due to downtime. Lost production will have a far greater economic impact than the initial cost of a CNC system.

Next time you want to play solitaire or write a document like this one, buy a PC and get good virus protection. (Speaking of viruses, what happens if your PC-based system gets one?) Then after a couple of years, buy another because your PC will be outdated.

If you want sound, long-lasting industrial shot peen machine control, get the right tool for the job. Demand a true CNC motion controller. ●