



CNC Improves Creativity And Increases Sales by 50 %

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A Techno computer numeric controlled (CNC) router has increased sales at Josey Custom Cues by 50 percent by making it possible to create inlays in any design a customer wants. Previously, when inlays and pockets were created using manual methods, inlay designs were limited to relatively simple shapes. Now, Josey can draw any shape in the software that controls the CNC router, and the machine reproduces that shape in the wood, cutting to a far higher level of accuracy than is possible with manual methods. **The Techno CNC machine has freed both Josey and his customers from creative limits and they can let their imaginations run wild.** This new freedom in the design of inlays on the cues has attracted new customers and has increased sales significantly in only one year.

Keith Josey was inspired to start Josey Custom Cues after taking one of his own cues to a shop for repair and being displeased with the results. Josey had learned the art of custom woodworking from his father, and enjoyed playing pool with his father and brothers when he was growing up. In 1992, he combined the two avocations into a business that now draws customers from all over the world. **Some of the leading professional pool players, including 1999 Viking Tour winner Shawn Putnam, use Josey cues. Teruki Kobayashi of Okayama, Japan, another tour professional, also plays with a Josey cue.**

With the exception of the tips, bumpers, and screws, Josey makes every component of his cues in his one-man shop. All ferrules, collars, and butt caps thread on for more



Keith Josey, Josey Custom Cues, and his Techno-isel 3-Axis System.

secure construction. Josey prefers a forward balanced cue with a solid stiff hit and each Josey cue is crafted to ensure superior playability. But it is the appearance of the cues that really makes them stand out. Rare, beautifully patterned woods gleam under a painstakingly applied, mirror-like finish. Inlays, using precious material such as mother of pearl, exotic woods, turquoise, and malachite, further decorate each Josey cue in intricate one-of-a-kind designs. **One Josey cue, which was featured on the cover of *The American Cueist* magazine, features a birdseye maple front with three long ebony points and three short ebony points with ebony diamonds. It also has six mother-of-pearl shields.** Ebony, micarta and silver dash rings run throughout cue. The wrap is bocote wood with six ivory diamonds and six turquoise diamonds inlaid inside two black phenolic rings. The butt sleeve is ebony with sixteen ivory points and eight turquoise diamond inlays. The buttcap is black phenolic with eight mother-of-pearl

diamonds. This cue is priced at \$3,100. Josey's least expensive cue sells for \$200 while some of the more elaborate ones are priced at more than \$10,000.

Depending on the intricacy of the design, it could take several hours to put all the inlays into a cue. Before he even starts that process, however, Josey goes through a number of preliminary steps. First he must find the wood. **He looks for highly figured woods and buys them from all over the world. Next he turns his shafts on a lathe six times over a six-month period, dipping them in a wood stabilizer after each turning to season the wood so it won't warp.** Next comes the process of splicing the front to the handle, and gluing the two pieces together. Josey then lets the cue sit for a few more months to give the wood a chance to move and breathe. He turns it again, then adds the ringwork, the precision metals or wood rings that go around the cue. After that, he turns the cue one final time.

Producing Inlays By Hand

The next steps in making a cue involve carving the pockets for the inlays and cutting the inlays themselves. In the past, Josey performed these steps manually using an Exacto knife and a Dremel tool. A Dremel has a number of different cutting tools, making it possible to cut diamonds and other simple shapes. If Josey didn't have a Dremel tool for a certain shape, he worked freehand using the Exacto knife. Both methods were time consuming, and they limited inlays to fairly simple shapes. Later Josey started using a small pantograph machine to trace more complex shapes onto the wood and then cut them out by hand. This approach gave him a somewhat broader range of inlay shapes that he could produce, but it still limited him in terms of designs. If a customer wanted an inlay in a certain pattern that Josey didn't have, for example, he either had to turn down the job or hire somebody to make the pattern for him. Another drawback to the pantograph he was using was that, although it was fairly accurate, it was still not up to the standards of Josey, who strives for perfection on every cue.

At a woodworking trade show, Josey investigated CNC routers that could cut wood according to patterns stored in a computer. Although there were quite a few such routers on display, the **Techno Series III** PC-driven CNC wood router from Techno-Isel appealed to him for several reasons. This machine is designed for production routing and drilling on a wide variety of materials including wood, plastic, MDF, solid surfacing materials, and nonferrous metals. The price includes the Mastercam CNC programming software, which was originally designed for metalworking but is also well suited for woodworking because of its ability to generate the most

complex contours with little programming effort. One of the things Josey liked about this system was that all the components—software, controller, router, and table—came from one vendor. Another plus was that this was a turnkey system, suitable for people such as Josey with no computer experience. Also, Techno's booth featured a pool cue with inlay work that had been produced by a Techno customer also manufacturing pool cues. This convinced Josey that this system was right for his needs. He purchased a three-axis Techno router with a 21-



inch by 39-inch cutting area. The cost of the entire system was approximately \$22,000.

New Inlay Process

Now, when it comes time to cut the pockets for inlays, the inlay designs are drawn in Mastercam. The software automatically creates the router toolpaths that will cut these shapes. After attaching the cue to the machine, he gives the command to start cutting and the machine takes over. One of the benefits of this system is that it can run unattended, cutting all the pockets on a cue before stopping. It does this by means of an indexing system that cuts the first set of inlays, then indexes and cuts the second set of inlays, and so on until the job is complete. Once the pockets have been cut, Josey cuts the inlay pieces on the router as well. The

shapes of the pieces are already in Mastercam since they were used to program the cutting of the pockets. Josey has equipped the Techno table with a vacuum device that holds the inlay material. After the machine cuts the inlays, Josey cleans out the pockets, and assembles the inlays into the cue.

Josey has prepared a brochure that shows many of his popular inlay designs. Sometimes customers ask for variations on these designs. Since the shapes have already been drawn in Mastercam, Josey just modifies the computer model to match the customer's idea and he is ready to cut

the inlay. The main advantage to cutting pockets and inlay pieces on the router, however, is that Josey can make inlays of any design that he or his customers can envision. The only requirement is drawing the design in Mastercam. No matter how complex a design is, once it has been drawn in the software, the router can cut it with a level of accuracy that satisfies even Josey. The Techno machine features a positioning accuracy of 0.1 mm in 300 mm. Its use of anti-backlash ball screws ensures play-free motion and makes it possible to produce extremely accurate inlay cavities in the wooden parts as well as the inlays themselves.

Josey is currently working on a new cue for Tommy Kennedy, a professional player, who will showcase the abilities of his new technology. This cue, like all pool cues made by Josey Custom Cues, will be both highly functional and a work of art. Now that Josey has added a CNC router to his operation, the cue-making process is still a labor of love by a master craftsman. But now the range of design possibilities has expanded to include inlays that were previously impossible to create by hand.