Wood & Wood Products

"CAM Joins Art, People, Pets and Fine Woods "

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CAD/CAM program enables this Wisconsin-based company to turn line drawings into 'WoodenNature' art pieces.

Golden Retriever, from among WoodenNature's stock breeds, is reproduced from stored Mastercam toolpaths. If the design is changed, the associative toolpaths regenerate with the click of a mouse button.

L ike many novel businesses, making intarsia portraits of friends' pets began as a hobby for Kevin Edgar. An intarsia image is created like a mosaic or puzzle from different woods and/or colored pieces of wood. Each piece is individually cut, shaped, sanded, and finished, then glued to a sturdy backing. The result is a 3-D art piece.

Within Wisconsin , word spread about Edgar's band sawn and hand-sanded creations. He soon embarked on a search for the optimum technology to increase the production rate of his creations.

"I have a passion for the art form and for working in wood," Edgar says. "It was very important to me that I select a method of design and manufacturing that allowed me to create the quality of handmade artwork at production quantities."

Edgar spent two years researching and rejecting production possibilities: abrasive water jet, stack band saw cutting, and sending prototypes for offshore production in wood or cast resin. None of those yielded the quality he sought. Edgar says, "I had no interest in setting up an offshore factory just to save production costs." He finally zeroed in on CNC routing as the best technique for his needs. It offered speed, accurate reproducibility and, of course, automated operation.

Edgar discussed his product and manufacturing decision with his friend Dan Place of Manitowoc Pattern and Mfg. Place recommended he use Mastercam to draw and toolpath his creations, based on his own use of the software.

Place showed Edgar some of the high quality work he had produced with CNC Software's Mastercam CAD and CAM capabilities.

In May of 1998 Edgar purchased a CNC 28-inch gantry machine and a copy of Mastercam. He began to import the 2-D images he drew and to generate the toolpaths within a couple of hours. Soon, WoodenNature was born.

To Market

Earlier experience had given Edgar some idea of the design preferences of his potential customer base. He began with booths in craft shows and other retail sales venues, then went on to wholesale gift shows to set up dealerships. By then he had moved WoodenNature into 8,000 square feet within his Silver Creek Industries operation. Silver Creek manufactures sound-amplifying devices used by bird watchers, hunters and law enforcement officers.

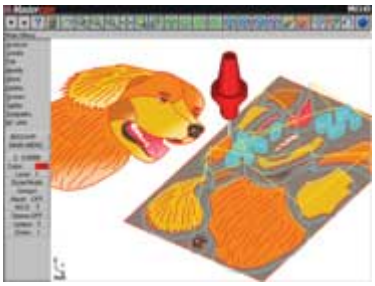
Edgar offered his wooden intarsia images online at **www.woodennature.com** and began selling to mail-order catalogs in late 2000. As he explored marketplaces, Edgar says he continued to do research. Finding that dog owners were his best target market, he began showing his pieces at dog shows and advertising in dog-owner magazines. WoodenNature now features intarsia portraits of more than 75 breeds of dogs and the list constantly grows.

Edgar also features lighthouses, birds and other wildlife as well as one-of-a-kind designs from customers' photographs of pets, homes or scenes. "One nice thing about Mastercam is that I can go from a photograph to a completely machined piece in two to three hours, so I have new pieces on the market almost instantly," he says.

From Paper to Plaque

WoodenNature stock designs and special orders begin from either a photograph or a line drawing. Edgar

traces photographs to create line art, "which I then scan, convert from bitmap format to DXF, and bring into Mastercam. I scale the file to its finished size in 2D and draw the image as a Mastercam file by laying curves and splines."



Shown is the Mastercam toolpath for detailing multiple pieces for Golden Retriever in one setup.

At this point, Edgar says, the artist inside the programmer takes over and enhances the image; enlarging eyes, for instance, to make them appear more realistic. Trimming the file to the final splines and curves, Edgar then creates an appropriately-sized, blank 1/2-inch thick virtual wood "palette" and 1/2-inch plywood backing set at the program's 0-0-0. Using the drag-and copy-feature, Edgar says he takes apart the new Mastercam-file "line drawing," nesting the separate pieces to maximize board usage.

Choices

Edgar then aligns the pieces with, against or at a bias to the wood grain, depending on the nature of the original illustration or breed. That way, the direction of a dog's hair growth pattern and other nuances can be captured.

When he's artistically satisfied, Edgar then selects a tool from the software's library and the program creates the toolpath required to cut all the pieces in one accurate and repeatable operation.

Cross- and bias-grain cutting bring their own challenges, Edgar says. Even the finest tool can climb into the grain a bit — a materials problem that cannot be solved by toolpathing changes.

"That's why I usually choose oak," Edgar says. "There's more wood cell adhesion; it cuts cleaner. I also like maple and cherry, but they change my pricing considerably. We just have to hope for the best when a customer demands pine." Stains or multiple wood choices further emphasize details.

When details such as whisker holes are required, so are additional toolpaths. To speed production, Edgar says he often first sets a 1/16-inch tool for the detail holes and runs the detail toolpaths specific to 10 or more boards in order. Then he retools and performs the 1/2-inch radius passes on each board.

WoodenNature craftsman Josh Reis finish-sands the tooth detail of Golden Retriever, adding a hand-textured dimension to the piece.

Each intarsia piece is cut individually. Smaller pieces get two passes to reduce stress on the wood; larger ones are cut to pre-finish with one pass. Edgar programs the software to step over 1/16 inch outside the toolpath so that the radius extends into the material, giving it the smooth joining bevel seen in the finished work. Cutting depth is set just above the material base; Edgar's method for releasing the parts from the leftover stock is proprietary.

The Finish
WoodenNature products require only light sanding after machining, thanks to the consistency of the toolpathing. Edgar says he has developed proprietary equipment to sand pieces faster while leaving a more hand-finished look than other mechanical sanding techniques. Artistic touches, like the curve of an eye or the shape of a tooth are hand-worked by trained craftsmen. Staining or painting, as in the case of the University of Wisconsin mascot, "Bucky Badger," comes next.

"Customer contact is vital here," says Edgar. "Since each finished piece is individually stained, we can customize not only to the breed of dog, but color the wood to match the customer's dog's coloring; we provide an enormous perceived customer benefit with no extra production cost." A coat of polyurethane seals the work.

WoodenNature has been growing exponentially and will soon become larger than the Silver Creek division. "It's growing because customers appreciate our artistic abilities and craftsmanship at prices that remain affordable thanks to CAD/CAM production. The reactions we receive from customers make us proud of our quality," Edgar adds.

For more information on CNC Software Inc./Mastercam, phone (800) 228-2877 or visit ***www.mastercam.com***