

the Edge



SB ROTARY CUTTER GETS UNDER SADDLE

When you walk into the offices of ThinLine, the women who greet you are as likely to be wearing riding boots and breeches as workboots and jeans. Pictures of horses and riders decorate the office, and the brown dog, Lugnut, brings you a chew toy. Move



into the back warehouse, and there are stacks of saddle pads separated into different uses: jumping, Dressage, Western Pleasure. Prominent in the corner: a ShopBot PRTalpha 96. No sawdust

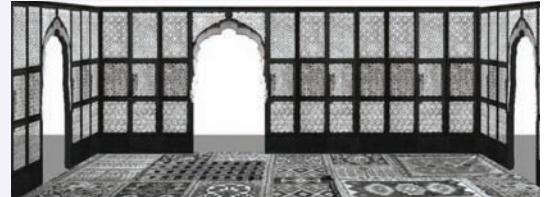
in this shop, just a big pile of scraps of the material used to create the saddle pads.

Elaine Lockhead, owner of ThinLine, has competed at levels where both horse and rider are disciplined athletes. She knows that, like a runner whose shoes don't fit, a horse with a sore back can't relax and concentrate on the task at hand. Drawing from running shoe technology, Elaine found a material that distributes the weight of a rider, making the horse more comfortable and the rider more secure. In the beginning, Elaine and two of her crew, Lisa and Tara, cut the material by hand from cardboard templates created by tracing existing saddle pads.

Elaine's not-so-silent partner in her various horse-related businesses is her dad, Duke Professor Emeritus Greg Lockhead. Greg contacted ShopBot to

SET FOR BROADWAY PLAY PUTS SHOPBOT PRS TO THE TEST

It was a perfect match. Theater Previews at Duke University needed panels that looked like screens for the set of The Great Game, a play bound for Broadway after its run at Duke. ShopBot wanted a project that would put the new PRS (Personal Robotic System) to a real test.



The time frame was tight, so it was necessary to push the system to the limit...90 panels with lots of plunges (230 - 350 per panel) meant the PRS would be running full time for two weeks solid. It took a few panels to see how hard the machine could be pushed and still give a clean cut in one pass with a .25" compression bit in .5" MDO.

Making a plan: The first step was to create ShopBot part files that would take advantage of the vacuum holddown system. Because we were interested in the "lattice", it



was more important to avoid shrapnel than get a good edge all the way around the waste pieces. For the largest 'holes', the most efficient tool path was to ramp into the material,

then cut around the waste that had enough surface area to be held in place with the vacuum holddown system. The smaller holes were cleared from the inside out so the waste was turned into chips and sucked away with the dust collection. Clearing rather than inside profiling the smaller parts added about 5 minutes to carving a 30" x 42" panel, but it was well worth the safety factor and the convenience of not having to clean out the dust collection hose.

Adjusting the Move Speed and Spindle RPM:

The edges of the lattice work were a bit rounded in the first panel, suggesting that too much pressure on the bit was causing bit deflection. When we compared



CHIP LOAD CALCULATOR

Question: What should my Move Speed be, and how fast should I run the spindle or router?

Answer: It depends.

Bit manufacturers have a formula for figuring out the how to get the optimal "Chip Load" for a given material. So, what is Chip Load and how do you figure out what yours is? Pick up some of the debris that's left after you cut, get out a set of calipers, and measure it. Then, use the formula to adjust the Move Speed and cutter RPM until the size (and shape) of the debris (the Chip Load) falls within the suggested range for that material. When the settings are correct, the bit should run cool, and the cut should be good.

There is a Chip Load Calculator and related information in the ShopBot Control software. From the Tool Bar, click on **Tools > Chip Load Calculator**. Click on what you want to know, and fill in what you do know.

The formula for figuring out Chip Load takes into account the material, the geometry of the bit (number of flutes, up-cut, downcut, straight, etc.), the move speed through the material, and the RPM of the spindle or router. When cutting the plastic for wire guides, we got the nice curls pictured after going to the Onsrud website (www.onsrud.com) for suggestions about move and spindle speeds for our roundover bit.



Other than random screws in the tool path, heat is your bit's worst enemy, so one clue that you have an appropriate balance between Move Speed and cutter RPM is that the bit is cool to the touch after a cutting session.

The recommendations can seem counter-intuitive. For example, as you increase the speed that you move through the material, you might decrease the RPM of the cutter. Of course, the quality of the cut is the most important thing, so keep a record of what's worked for you, and make adjustments as needed.

TIP FROM THE SHOP

The clue that the collet was bad was subtle. Parts were no longer being cut all the way through. Was the bit being pushed up in the collet by the fast plunge to the full .5" cutting depth with a quarter inch bit? In a quick check, the bit felt like it was tight in the collet. Besides, this was the last panel of the day...



All too soon, a change in the sound pattern indicated that there was a major problem. Within moments, the bit had dropped out of the collet to cut across the face of the material, then plunge into the bleeder board and through to the plenum. The lesson: when in doubt, change the collet.

It's time to change the collet if:

- o The bit is being pushed up into the collet while cutting.
- o The cut is getting deeper and deeper, even though the height of the Z hasn't changed.
- o The bit drops out of the collet while cutting.
- o The bit won't drop out of the collet when you loosen the collet to change bits.
- o Cuts are rough or show burn marks, even with a new bit.
- o The bit is hot after a run, even though you have the move speed and spindle/router RPM set correctly.
- o Bits start breaking for no apparent reason.
- o You've used the same collet for more than 400-600 hours. Collets are consumables with a definite life span.

Maintain your collet:

- o Clean out the crud and dust from the collet frequently. The collet can't grip the bit if it is clogged with debris.
- o Don't overtighten the bit in the collet.
- o Make sure the shaft of the bit fits the collet, both circumference and length.
- o Don't forget to clean the inside shaft of the spindle of resin and debris.



Always change the collet after:

- o You've hit a screw or some solid object.
- o You forgot to tighten the bit in the collet, and the bit dropped out while cutting.

It's always faster and cheaper to change the collet than to ruin the work, and even the setup. Be prepared: have at least 1 backup collet for all the size shanks you have.

And do yourself a favor...**THROW THE DAMAGED COLLET AWAY IMMEDIATELY.** It's failed you once, it doesn't deserve another chance.

Do you have a tip or a story that you would like to share in the newsletter or on the website? Leave a message for Sallye at 888 680-4466 or email Sallye@shopbottools.com.



create a system that could cut out the saddle pads using a rotary blade like a small pizza cutter.

ShopBot replaced the router in the Z axis with a motor, and added a bracket to hold the rotary blade at an angle to bevel the edge of the saddle pad. Bill Young created a post that translates a standard Part Wizard file written for 3 axes into a file that also generates movement in a 4th axis to rotate the cutter head as it moves around the saddle pad file (X, Y, Z and B).



Lisa and Tara, friends since childhood and riding students of Elaine's since middle school, were not sold on the idea of the ShopBot when it was first introduced. Although Tara had more experience with computers, Lisa knew that the running of the "Bot" was going to fall to her. She confesses that she didn't like the idea one bit. Luckily, Elaine and Greg were willing to invest in training beyond the standard 2 days included in the assembly package.

While Lisa became comfortable running the ShopBot Control software, ThinLine accepted help with translating the cardboard templates into Part Wizard files. They also found that, as long as the paper backing was intact, the material could be held in place with weights and clamps. Now, Lisa "owns" her 'Bot. She has a master library of design files to cut pads as needed to maintain inventory, and can create custom orders on demand.

Lisa has also had a hand in creating the User's Guide for others who are interested in the ShopBot Rotary Cutter. "I wrote the section on 'How to Break a Blade?'...and I'm adding new ways to do it all the time."

"You know", Elaine said recently, "the quality of this bevelled edge has made all the difference for us. Professional saddle fitters endorse ThinLine because, with this bevel, the saddle pad meets a horse's back without creating a sore spot." Then, she was off to talk to yet another tack shop about her saddle pads.



www.thinlinepads.com

the size of the chips that resulted from the cutting to the recommendations of the bit manufacturer, we saw that they were too big. We used the **Chip Load Calculator** in the ShopBot Control software (see opposite page) to tweak the settings. Increasing the RPM on the spindle to 22K and reducing the Move Speed to 6 ips resulted in great edges. Also, the carbide bit would be only slightly warm to the touch after a solid hour of cutting panels.

A ShopBotter's opinions:

"My favorite change in the PRS is the way the dust skirt is attached. I know it's a bit like the drink holders in a car...not at all the most important thing, but it is so easy to change bits because you can drop the dust skirt out of the way. I took the smoothness and precision of the machine for granted after the first



panel. It was very rewarding to see the stack of panels grow, and to see the final set."

The PRS is a significant change from the PRT.

The Y and Z axes ride on a gantry of extruded aluminum, and the X rails are an integral part of the extruded aluminum table sides. Everything comes from the factory already square, so it's even simpler to assemble.

The PRS comes in alpha and standard models. To watch a PRS in action, visit www.shopbottools.com/products.htm. Or call ShopBot at 888-680-4466.



Upgrade your PRT with the ShopBot Version 4G Control Box and Spindle

If you have a ShopBot PRT, and would like to get 2.5 times the resolution and a smoother and faster cut, consider replacing your standard PRT control board with a ShopBot Version 4g Control Board with Geckodrives. It takes just a few minutes to plug in the board and load the newest ShopBot software. You even get a rebate for your old PRT board. See the website (www.shopbottools.com/prt_4g_upgrade.htm) or call 888 680-4466 for more information and pricing.

Of course, the faster cut speeds won't do you as much good if you're still cutting with a Porter Cable router. The HSD 2.25HP High Frequency Spindle is a great option and is available in single phase or three phase for the same price of \$1995.00. Check out the ShopBot website for more spindle options.

JAMBOREE MOVES TO WEST COAST FOR 2007

The 2007 ShopBot Jamboree to be held in San Mateo, CA

Jamboree: May 17 - 18
 Pre-Jamboree ShopBot Training: May 16
 Registration & Welcome Party: May 16
 Woodworking for Women: May 18
 Schedule and details on the SB website

The Jamboree will be followed by the **2007 Maker Faire**, a two-day family-friendly event for creative, resourceful folks who like to make things.

www.makerfaire.com/www.makezine.com

AWFS in Las Vegas July 18-21

Las Vegas Convention Center:
www.awfsfair.org

CAMPS SHOPBOT

A huge **THANK YOU** to the ShopBotters who opened their facilities to host a Camp ShopBot in 2006 and early 2007. There were Camps all over the USA, and one in England. ShopBotters and guests who attended shared information and stories about their businesses, machines and software.

Contact Bill Palumbo (campshopbot@shopbottools.com) for more information about the Camps, and to inquire about hosting a Camp. The Camp schedule is posted on the website: www.shopbottools.com.

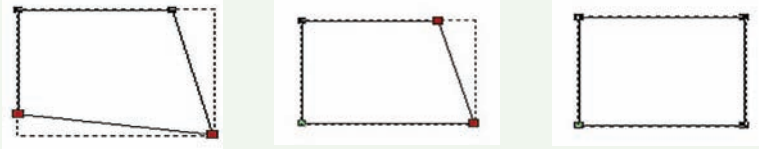
USER GROUPS

New: Upper Midwest ShopBot User Group
 contact: David McNutt

N843 Grantwood Ct, Merrill, WI 54452
 Email: mcnutt@verizon.net Ph: 715-536-5541

Part Wizard Tip

The **Align Nodes** feature in Part Wizard will let you straighten a line along the X or Y axis.



1. Select one object and move into Node Editing mode by either clicking on the **Node Editing** icon, or hitting the "N" key on the keyboard

2. **Select** the nodes that you want to line up (align)

-The nodes will turn red as you left-click on them

-The **LAST** node that you select will become the "reference" node: the one that all the other selected nodes line up in reference to

-Hold down the **Shift** key to select ALL the nodes between the first and last selected

-Hold down the **Control** key while clicking on nodes to select SOME of the nodes in the order you want

-If you do a "sweep select", you'll only get the nodes inside the sweep, but you won't have much control over which is the "reference" node

3. Right-click to bring up the correct menu

4. The **Align Nodes** command is only available if you have actually selected nodes (they are red). Put the cursor on the arrow to swing out the options.

-In **X** aligns nodes vertically

-In **Y** aligns nodes horizontally

TRAINING CLASSES AT SHOPBOT

contact: scott@shopbottools.com

Basic Training: Apr 13 - 14, May 4 - 5, Jun 1 - 2, Jun 22 - 23

ArtCAM Pro: Apr 8 - 10, Jun 15 - 17



3333-B Industrial Dr
 Durham, NC 27704
 888 680-4466