Background Information on Easel Pro by Inventables

What is Easel Pro?
Easel Pro is a paid cloud software which builds upon Inventables' free Easel software. Easel and Easel Pro minimize the barriers associated with complicated CAD and CAM product manufacturing software, making it easy for users to produce physical products. Easel Pro's new production efficiencies decrease the amount of time required to carve detailed products, enabling businesses to produce more products per day and bring in more income.

Who is Easel Pro for?
Easel Pro is targeted at people making a living off selling products produced on their machine(s). Our mission at Inventables is to build accessible communities and tools for the maker journey. Easel and Easel Pro are designed to work together and support the transition from learning to earning income. The market for manufacturing is changing. Today, people make their full living off X-Carve and Easel. Easel Pro helps them make more products per day because they can carve detailed products much faster. More products per day means more money comes in each day.

Why did Inventables launch Easel Pro?
Over the last few years, we've seen an increase in the number of customers starting, running, and growing businesses with our tools. We believe manufacturing is undergoing a transition. We are moving from the 20th century model, where large factories produced the majority of products, into the 21st century: micro and indie manufacturing companies produce products alongside factories. Easel Pro is focused on supporting and accelerating this transition.

What are the features and benefits of Easel Pro?
Easel Pro's new production efficiencies decrease the amount of time required to carve detailed products, enabling businesses to produce more products per day and bring in more income. In addition to production efficiency, businesses can expand their product offerings with Easel Pro's built-in customization tools. With hundreds of built-in fonts, businesses can design personalized products for customers. Additionally, makers can import company logos and brand images into the program and apply them to existing product templates. Easel Pro customers are also invited to share information with other business owners in an online forum.

"Easel Pro helps the customer with designing their sign because it gives them more input," said Debbie Lee, founder and co-owner of 8th Line Creations, a custom woodworking company focused on hand-crafted products. "Customers can say, 'I helped create this. This is my sign that I created with them.'"

With Easel Pro, business owners:
- Report saving time on each product they make, allowing them to produce more products in a day
- Sell products with a greater level of detail at a higher price point without increasing production costs

- Offer more customization options to customers by choosing from hundreds of new fonts
- Avoid investing in complex and expensive software
- Can take 2D designs and achieve 3D effects using v-carving toolpaths and v-bits
- Minimize production errors

What is V-Carving?

V-carving is the action of carving with a v-shaped bit to generate designs with varied width. The unique shape of v-bits create carves that are narrow at the deepest part of the carve (created by the tip of the bit) and wider at the top of the material.

How does it work?

It's important to note that true v-carving requires more than just putting a v-bit into a 3D carving machine and carving a 2D design. V-carving requires toolpaths that move all three axes (X, Y, and Z) at the same time. Standard 2D carving only moves the X and Y axes at the same time, with the Z-axis raising and lowering at the start or finish of a tool path.

In order to achieve a true v-carving effect, the bit must gradually rise up as it exits a toolpath, meaning that the Z-axis is moving in sync with the X and Y axis. This movement creates a tapered look entirely unique to v-carving.

Why would I want to use v-carving?

For many, v-carving is something that may not be appealing until you try it. The benefits of v-carving far exceed making things that "look cool." These benefits are easy to quantify for makers of all skill sets, ranging from hobbyists to small business owners.

Òç^¦ˆĖÚã*¦^ĖÖ^ææĖThere's nothing worse than designing a project, carving it, and then noticing that the entire design didn't carve correctly. Regular 3D carving bits have flat bottoms that they can only carve areas as wide as the bit's diameter. For instance, if you're using a 1/16" bit, you'll only be able to carve areas that are greater than or equal to 1/16" wide. The tip of a v-bit has a cutting diameter of .001" so you can carve every element in your design, no matter how small.

Ùæç^Áãĵ^ĖAs noted above, you can carve designs ranging from .001" to ½" wide with a single v-bit. Rather than use [two-stage carving](#), you can carve designs using only one v-bit. By not changing bits halfway through a job, you'll drastically reduce carving time.

Þ[ÁT[¦^ÁÖ¦[\}Áãæ ĖV-bits are more robust than fragile engraving bits, but still capture every detail. The durability of v-bits allow you to carve complex, intricate projects without the risk of breaking a lot of 1/16" or 1/32" bits on longer jobs.

HÖ{ˇqˇoÁ¦[{ÁGÖ¦^•ã}•ĖComplex toolpaths move your machine along all three axes—X, Y, and Z—at the same time. These dynamic machine movements give more depth and dimension to projects that you can't get from standard 2D toolpaths.

*Ta时间T[T[}^^È*f you use your machine to run a small business, v-carving practically pays for itself. You can elevate the quality of your projects simply by using a v-bit on your existing products. With final products that look this good, you can charge more for each item you make without any additional work.

*V@A æ ã•é£ædçã *Á[ç æ^ÈÚ^/ã åÈ*asel Pro removes the barriers to designing your file by automatically generating v-carve toolpaths. Select your v-bit, design your project, choose your material, and carve. There are no complicated feeds and speeds algorithms or steep learning curves. If you can use Easel, you'll build incredible projects in Easel Pro.

Can I use V-Bits on a regular Easel project?
You can still use v-bits with Easel projects, but you will not get the same output as using Easel Pro. True v-carve effects require toolpaths that move in all three directions at the same time. Easel can not render toolpaths that move the bit along the X, Y, and Z axes simultaneously; only Easel Pro projects generate these complex machine movements.

If you design a 3D project in another CAD/CAM program (Fusion 360, V-Carve, Aspire, etc.) and import the gcode file to Easel, X-Carve and Carvey are capable of making the necessary movements. The difference is that Easel does not have the ability to create the toolpaths for Easel-designed projects, even though you can import gcode into Easel and the machine will carve it. Easel Pro is capable of generating the necessary v-carve toolpaths, so you can design projects directly in Easel Pro without using outside software.

Can I try Easel Pro for free?
When you purchase an X-Carve or Carvey machine, you purchase the rights to use Easel Pro for any four (4) days of your choosing each month. You will always have access to designing with Easel Pro's features, but you only have access to carve these features for four days every month if you don't have a paid Easel Pro subscription. To further support people on their journey, if customers need an extra day but aren't ready to pay monthly they can purchase additional Easel Pro days for $2.

Easel Pro costs $19.99 per month if you opt for a monthly subscription, or $12.99 per month (billed all at once, annually) for an annual subscription.

Optimizing V-Carve Projects for Easel Pro

Many photographers start out with a simple point-and-shoot camera. Over time, they may desire higher-quality photos and more control over their art. Similarly, your carving projects may start to

demand more professional results as you advance on your maker journey. You may want more from your carving projects or your time may begin to become more valuable to you. For this reason, we developed Easel Pro: a subscription-based upgrade to help established or burgeoning makers s take the next steps in advancing their business.

V-carving is one of Easel Pro's most powerful features. Built upon the same easy-to-use interface as our free Easel software, Easel Pro simplifies v-carving from design to final product. Easel Pro removes the barriers to designing your file by automatically generating v-carve toolpaths. There are no complicated feeds and speeds algorithms or steep learning curves. If you can use Easel, you'll build incredible projects in Easel Pro.

There are some helpful tips and tricks for obtaining certain v-carve effects in Easel Pro. Whether you're new to v-carving or you're familiar with other v-carving software, this article is intended to help you get started designing projects in Easel Pro.

Selecting your v-bit
Just like in Easel, we suggest entering your material dimensions, material type, and bit type before beginning any project. For both Easel and Easel Pro, you can set material dimensions and material type the same way.

In Easel Pro, you'll notice is the addition of v-bits in your Bit Selection menu. You can select the 90 degree or 60 degree v-bit from the menu. These are the v-bit sizes we sell in our store. If you have a v-bit with a different degree, you can select "other" and check the "v-bit" box to add the specs of your v-bit.
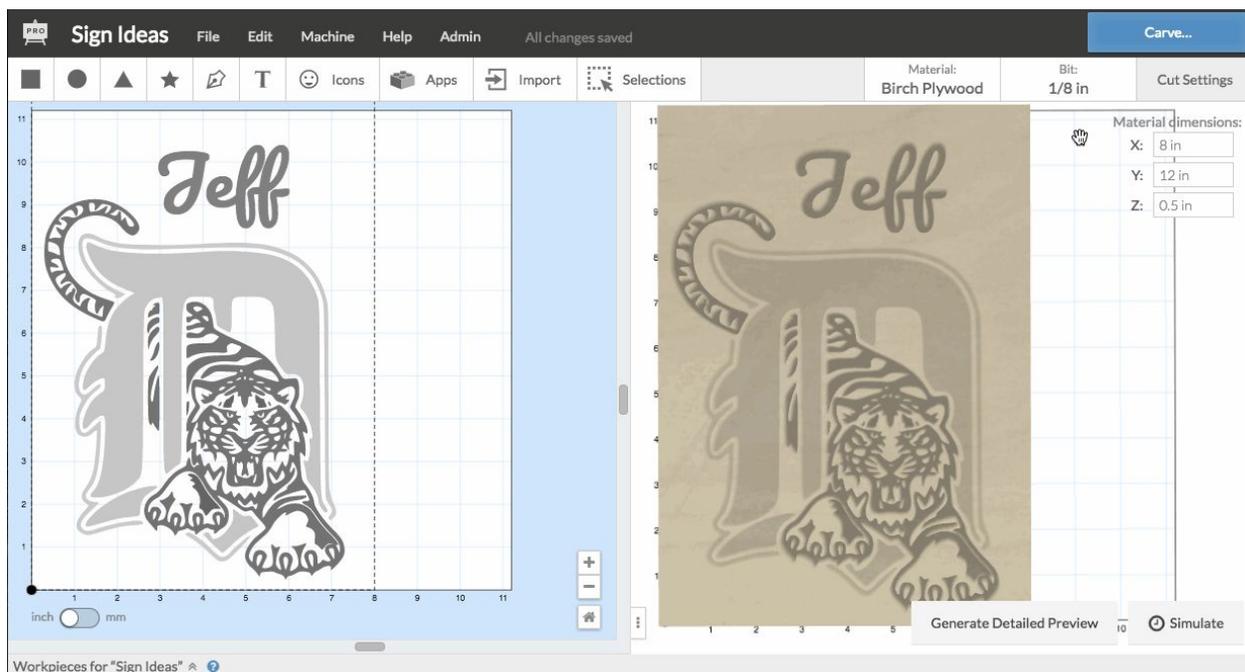
Fills

For fill shapes, v-bits carve as deeply as possible to the intended cut depth as long as the bit does not go outside the boundaries of the design. In other words, the bit will always attempt to carve down to the design's cut depth. However, if carving to the indicated depth jeopardizes your design, the bit will not carve the full depth.
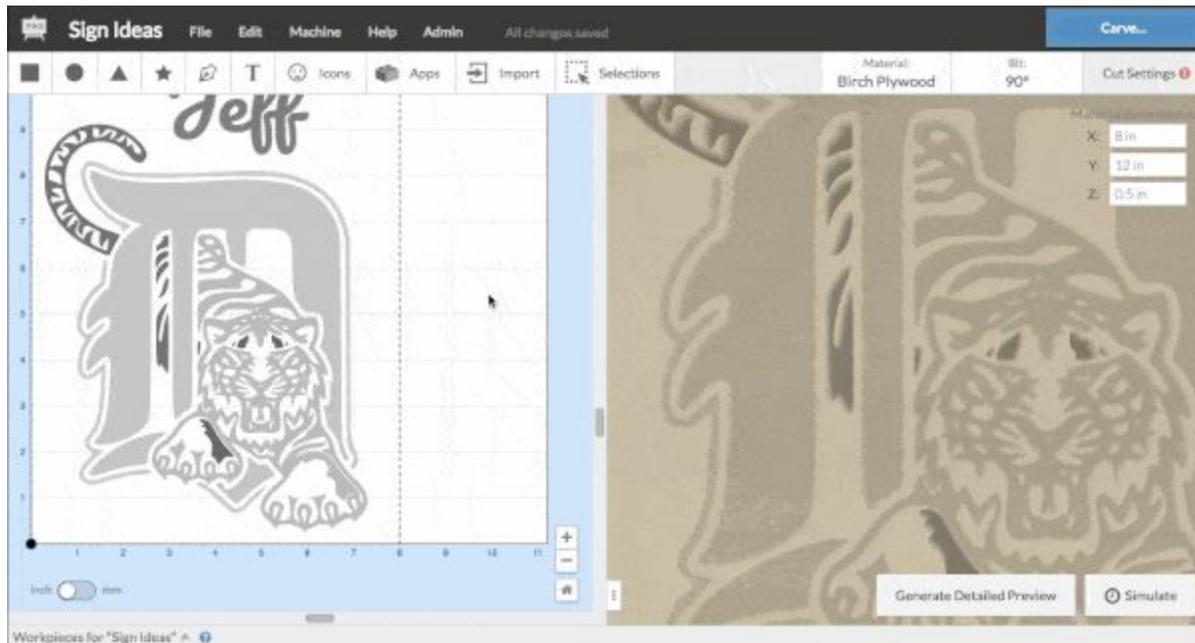

The bit yields to the design's limitations first and foremost when carving fill shapes. In Easel Pro, fill shapes include any shapes displaying as "fills" in the Cut/Shape menu.

Text elements added using Easel Pro's text tool qualify as fill shapes, as shown in the above GIF. Treating text elements as fill shapes allow v-bits to carve deeper on thicker parts of certain letters and shallower in thinner areas—even on the same letter.
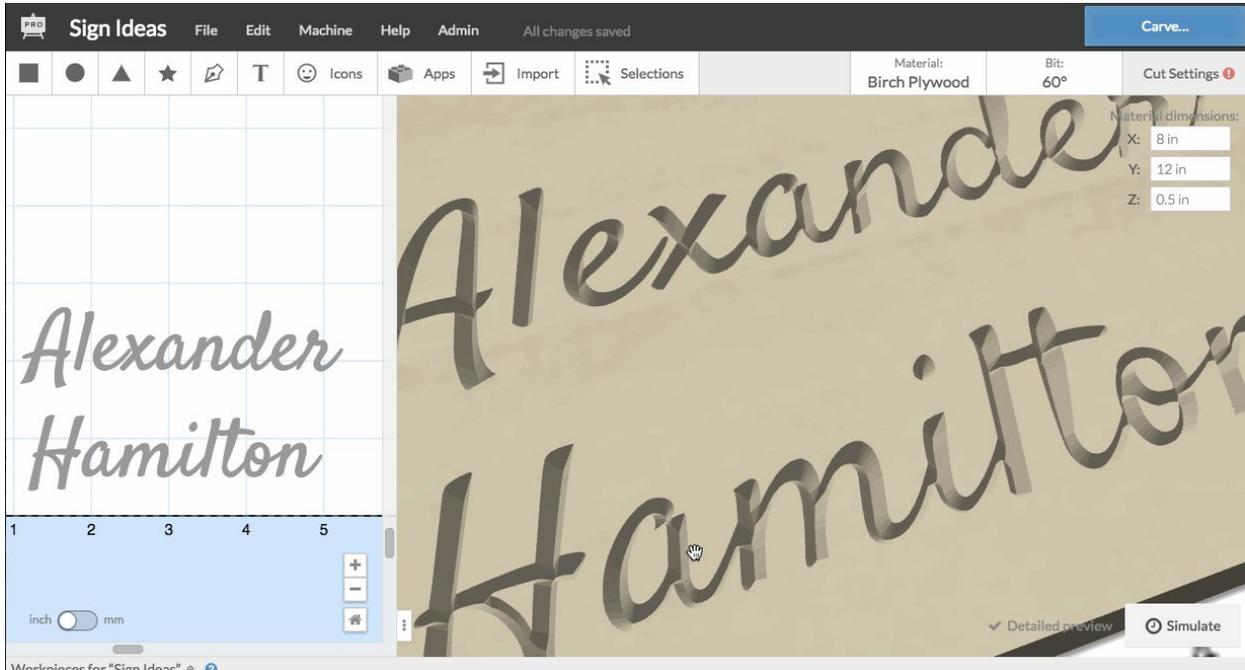
Notice how the depth of the text in the next GIF doesn't change, even when the depth is set considerably deeper on the Cut/Shape menu. This is because the bit cannot carve any deeper without going outside the boundaries of each letter's design.
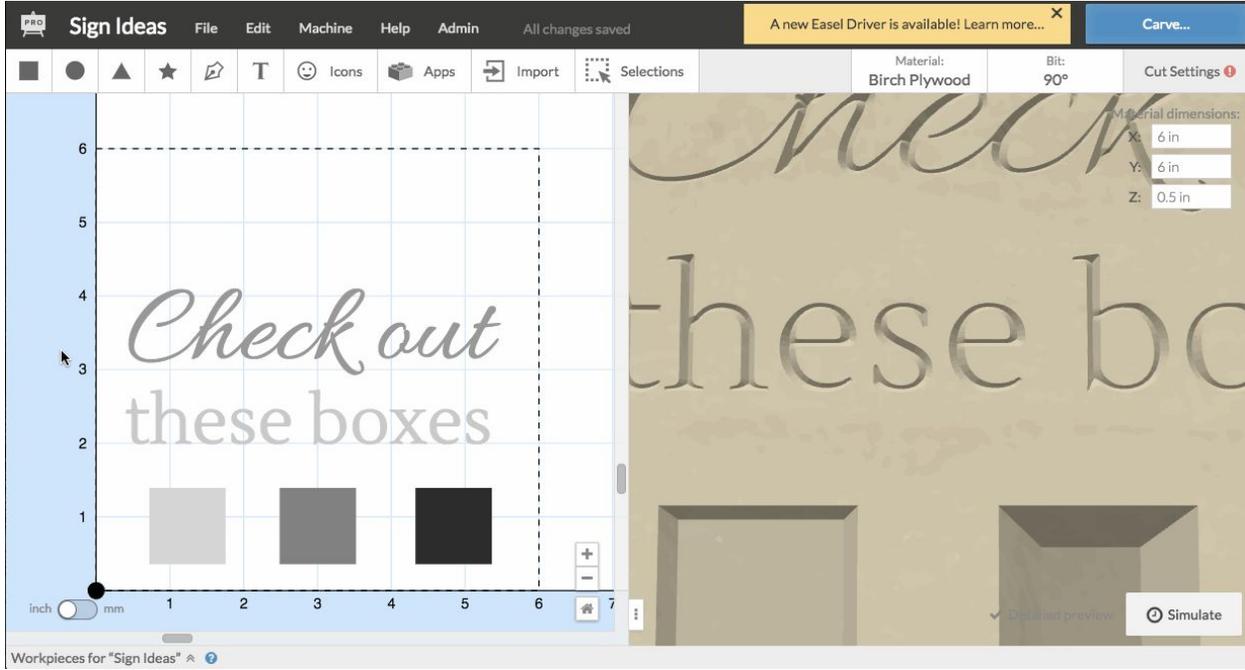
Outlines

For outline shapes, a v-bit will always carve to the indicated depth set in the Cut/Shape menu. This means the width of the outline will change depending on the depth.
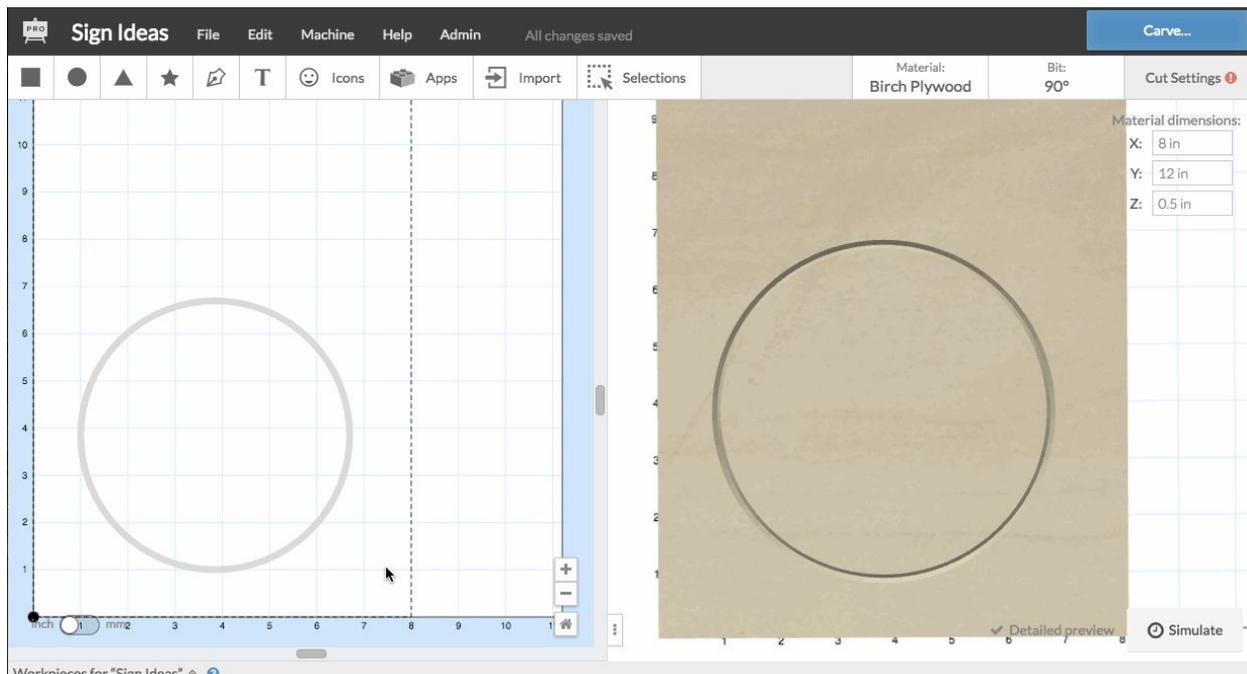
If you have a shallow outline, the toolpath narrows because the shape is carved by the narrowest end of the v-bit. A deeper carve will have a wider toolpath. As the machine carves deeper into the material, the v-bit carves using the wider part of the bit. This results in a wider carve.

Pockets and Two-Stage Carves
One of the perks of using v-bits is carving toolpaths with beveled edges that come to a point at the deepest part of the toolpath. However, sometimes your project requires a flat surface at the bottom of a pocket but with beveled v-carve edges.

To create a pocket with a flat bottom, we recommend using the two-stage feature. You can carve the majority of your project with a flat-bottom bit and complete a finishing pass with a v-bit.

video using 2 bits

Using two-stages carves in this way is an effective technique for carving out large pockets quickly while still taking advantage of a v-bit's unique toolpath.

Bit degrees
The degree of your v-bit determines a variety of factors related to your carve.

Generally speaking, the smaller the angle on your v-bit, the deeper the bit will carve. This is because a smaller angle equates to a narrower angle. Bits with a narrower angle are able to carve deeper without going outside the bounds of the design. Since a narrower bit angle can stay within the boundaries of the design as it carves deeper, you are able to achieve deeper depths when a bit has a smaller angle.
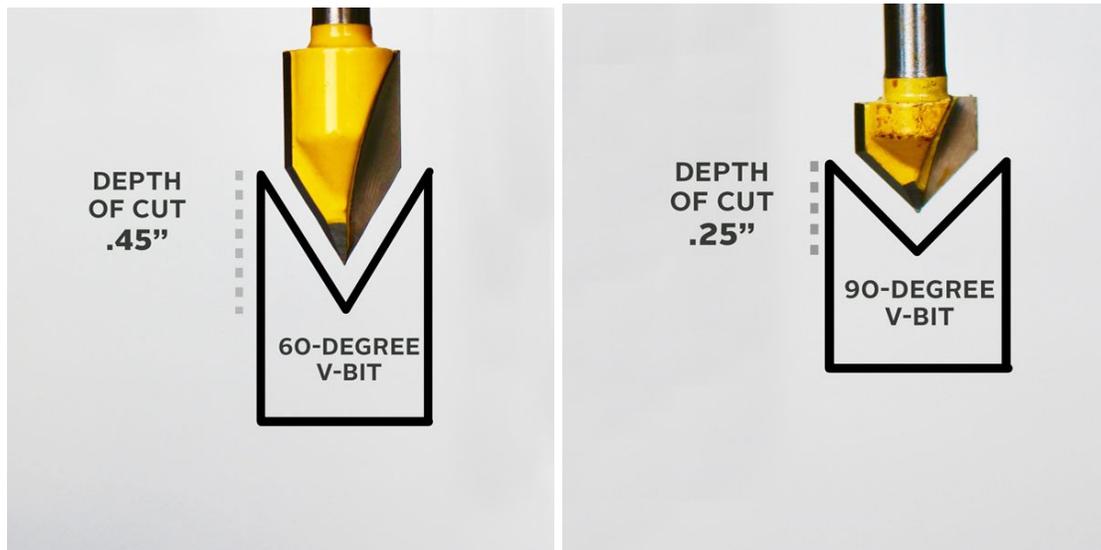

A 60-degree v-bit will carve deeper than a 90-degree v-bit because it can carve deeper into a design before the design's limitations prevent the bit from going down further into the design. Likewise, a 30-degree v-bit will carve deeper than a 60-degree v-bit.

Compare the Easel Pro detail previews of these different v-bit angles (30 degrees, 60 degrees, and 90 degrees):
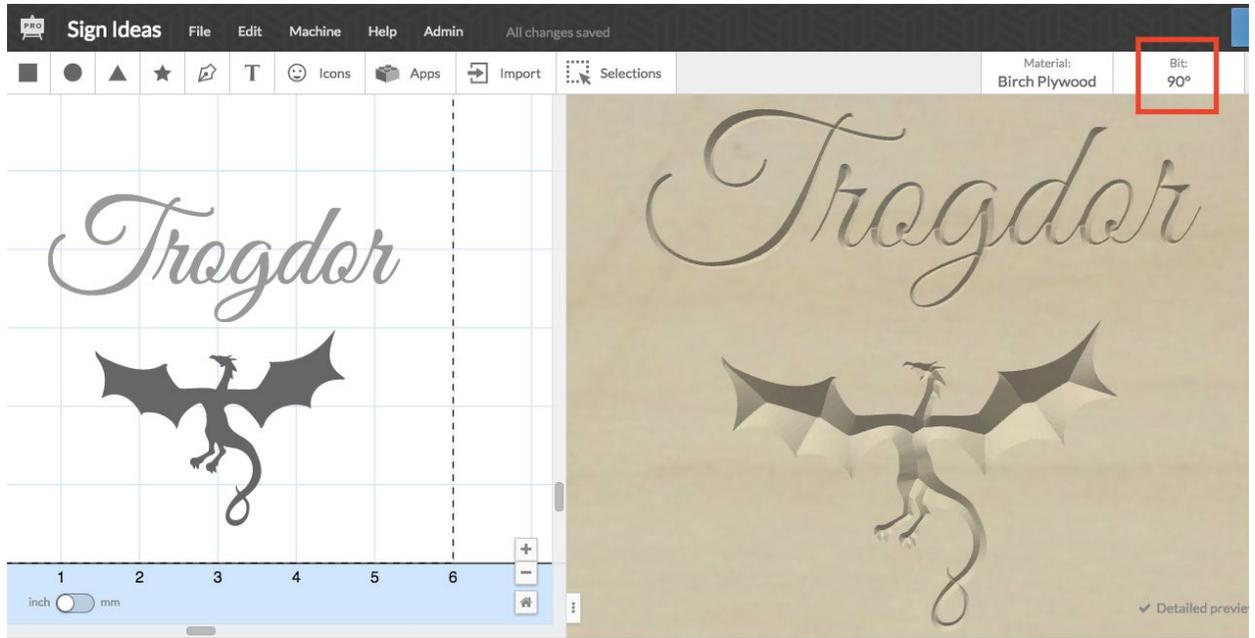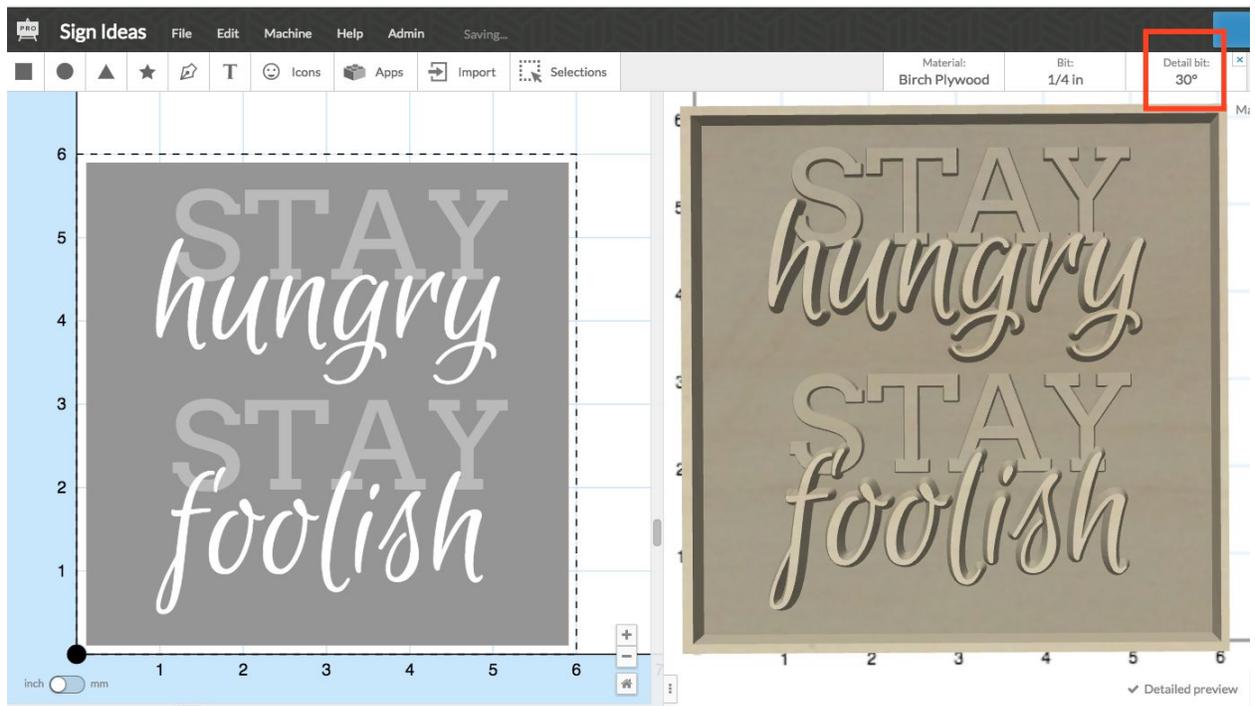
30 degree v-bit:
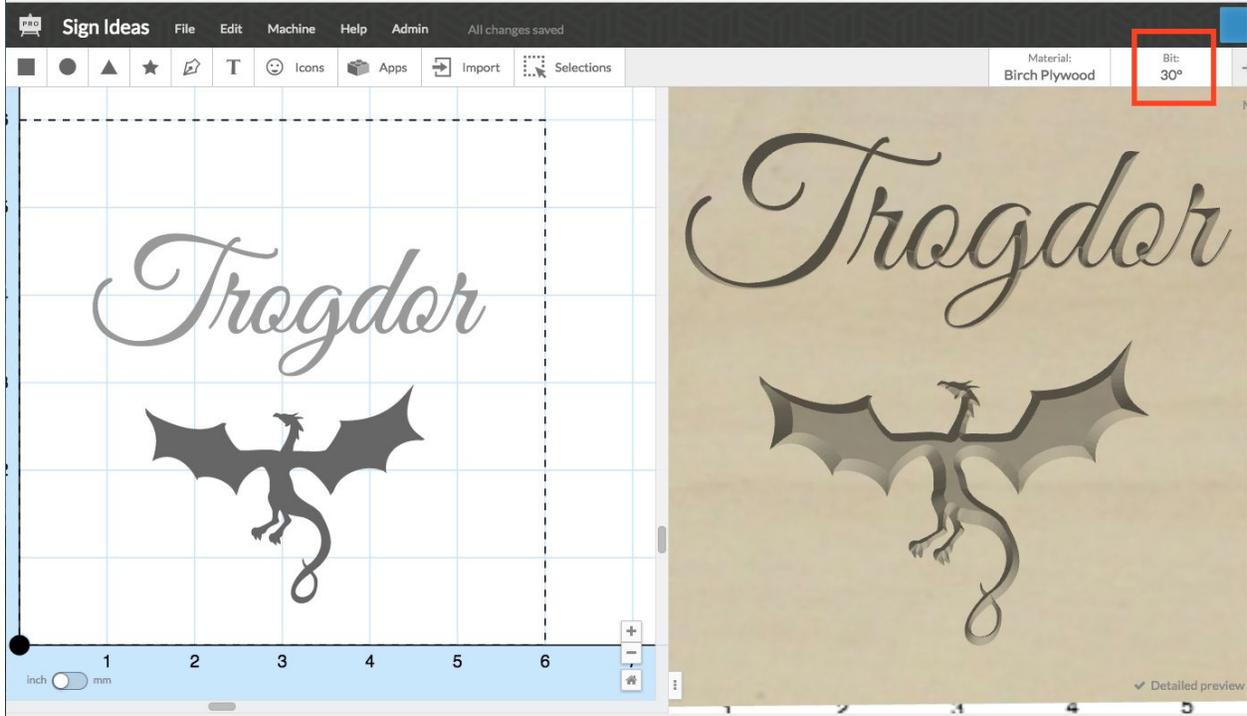
60 degree v-bit:
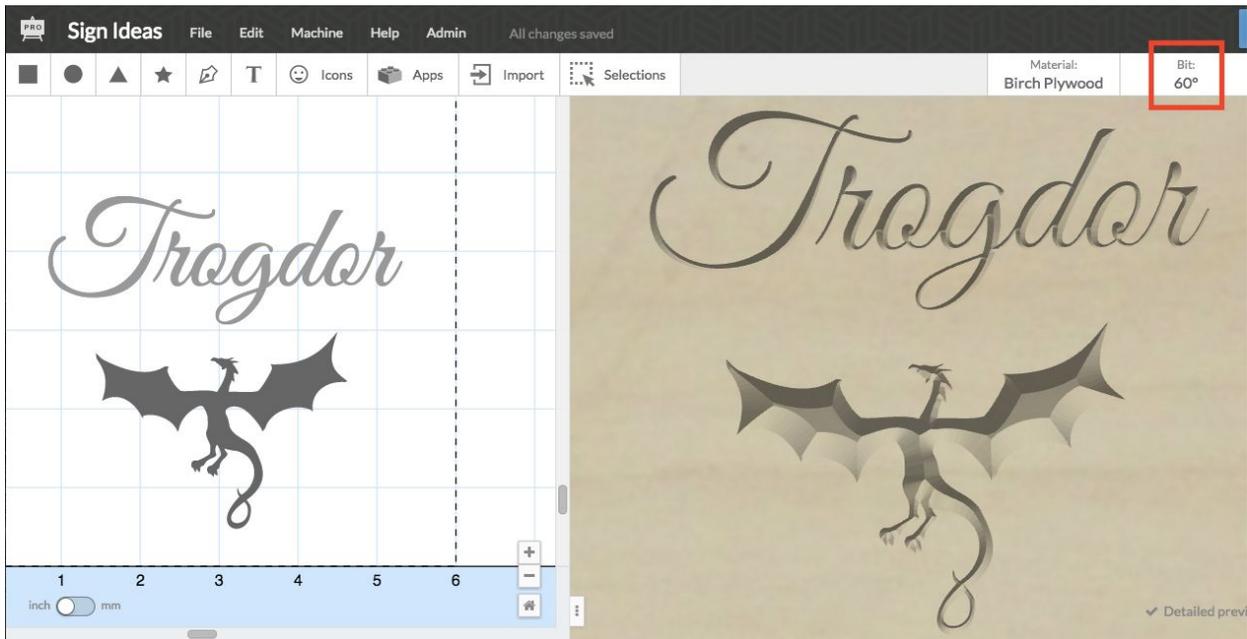
90 degree v-bit:

30 degree v-bit:

60 degree v-bit: