

Using a router or rotary carving tool on the lathe

In the first of a new series on woodturning challenges, Kurt Hertzog looks at using a router or rotary carving tool on the lathe

As we begin a new series on 'woodturning know-how', let me lay out the tentative plan. We'll explore a variety of woodturning challenges ranging from product design to process capability. We'll take it through execution presenting a solution and some of the alternatives available. Certainly all of the possible options can't be included but those presented will allow the reader to complete the project following a different path if they like that better. The key components will be to provide the problem analysis, thinking process through to a solution and some alternatives to allow the continued personalisation of a different solution path. Obviously, if we fabricate things, we'll need to include other workshop operations and skills in addition to the woodturning aspects. From my perspective, these can often add as much enjoyment to your workshop time as can the turning part itself. Please don't be put off

when I include other workshop equipment such as the bandsaw, tablesaw, drill press and various hand tools. For those without this support equipment available, almost everything can be accomplished with a hand tool or at a friend's workshop who has those pieces of equipment.

Sometimes the problem I'll present may seem a bit silly or contrived. The reason for that problem selection will be to illustrate a train of thought that I believe will add to your repertoire of problem solving techniques. The end goal might seem pretty simplistic or mundane but hopefully the solution thought process will provide a much bigger picture beyond the contrived task at hand. It might be workholding methods, strength of materials, material conservation, process flow, repeatable yields, or some other issue. The exploration of all of these problems will be diverse and over the course of the series it will include topics ranging

from lamp pulls to large-scale assemblies. We will cover large-scale material removal needs to minute surface alterations. Each series segment end goal will usually be a workshop aid and/or completed turning but more importantly the problem solving train of thought.

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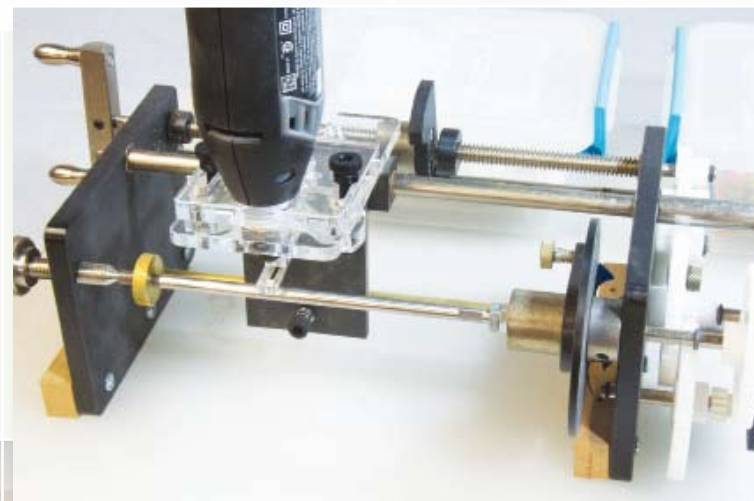
THE PROBLEM

Let's begin our series with the problem of how to use your router on a turning. Meant for flat work and challenged on round work, why would you want to use a router? I can think of many applications where a router or other rotary tool would add some value. Simply putting flats or spirals on a turning leaps to mind. Sanding features in at a regular interval or drilling holes more precisely at various parts of the rotation would be a nice capability. Nearly any cutter, drill, sander, or artist tool that you would like to bring to bear in a more precise manner at various indexed spots lend themselves to this project. For the sake of argument, let's include any rotary tool ranging from the Dremel tool through Foredom to the multi-HP plunge router. While not included other than mention, don't forget that everything included here is also applicable to air powered tools and hand held pistol drills. All fall into the rotary cutting tool category.

SHOP BOUGHT SOLUTIONS

There are commercial solutions available to provide interaction with a router and the available cutters to a woodturning. The two that jump to mind are the Legacy ornamental mill - www.legacywoodworking.com - and the Beall Pen Wizard 2 - www.bealltool.com - and its predecessors. Both of these are purpose designed to allow the turning to be presented and 'timed' to the action of a rotary cutter. Both do exceptionally well at their task but do have a cost and space requirement that might prevent you from pursuing them. They both have the advantage of being able to couple the woodturning rotation to the linear traverse of the router cutter allowing for spirals, fluting and twists with a controllable timing like threading cutting on a metal lathe, for example.

BELOW: There is a family of Legacy ornamental mills, full sized and capable of exquisite woodworking and woodturning components. Superbly designed and built but perhaps beyond the space and price constraints of many of us



ABOVE: The Beall Pen Wizard 2 is a pen and small spindle orientated mill using a Dremel or Foredom style tool. While small and modestly priced, the applications of this system are best suited to pens and the like

OUR CHALLENGE

We'll begin our series with a much simpler project geared for the workshop handy turner. Let's tackle the marriage of the router to the lathe in a freehand manner. We'll create the ability to bring the router capabilities to a turning while using the lathe as a workholding device and indexing unit. The assumption is that the lathe itself has an indexing head that allows

for rotation and locking. For those without this capability built into their lathe, there are commercial solutions available such as the Alisam Indexing Attachment - www.alisam.com - and others. In a future part of the series, we'll explore solutions to indexing as a topic. Our project here simply involves creating a work platform or table and a tool carrier for a lathe with indexing capability.



Just some of the tools that we can bring to bear on our woodturning with the creation of our table and carrier. Table and carrier size can be scaled up or down based on your needs

THE PIECES REQUIRED

With the ability to index and lock rotation as a given, we've got a couple of items to tackle. We need to create a stable and smooth platform surface and a way to anchor it to the lathe. Once that is in place, we'll need to create a carrier for our tool(s). The goal is to make a safe, repeatable yet adjustable, mechanism for the router to be used as well as taking advantage of any depth adjustability that the rotary system might have itself. Let's design a solution that is easy

to make in the workshop, adjustable in use yet repeatable, and not lathe specific from a design standpoint. That will allow for the mechanism to be adapted and used with any lathe you'll encounter.

There are router to lathe designs to create a track system to guide the router. They are often an 'over the top' type of scheme. They are workable but I think far more complex and less adaptable to the simple table and tool carrier I propose. Rather than build a framework like

those designs that support the router overhead, let's take a look at a method of presenting our router from the side without a framework. This can be a fixed height design making the construction simpler but I think it is worth the extra effort to make a tool carrier with some minor height adjustment considerations. This allows for use of multiple tools with different adaptors as well as adjustment to achieve dead-on centreline or an adjustment above or below the centreline.

OUR PLATFORM

The first order of business is to create a work platform on the lathe. Because the ways of the lathe bed present a minimal platform, let's expand that to be more substantial. Your choice of platform dimension can be of your own choosing since your needs will vary on your type and size of turnings you do as well as the size of the router you'd like to present. The two key considerations are that the top surface be smooth since it will be a sliding surface and that it be flat. You can make your table from plywood, Masonite, particle board, scrap counter top material, or the like. For those who might not have a way to easily cut this material, I've shown a store bought, pre-cut and finished shelving material. The platform strength doesn't need to be excessive but it should not flex if you work away from the support that the ways provide.

The first problem to consider is the platform attachment to the lathe bed. There is no real standard gap in lathe beds and even some manufacturing variation in the gap as you travel the length of a lathe bed. A solution that I think makes sense to me is to cut a piece of wood to fit this gap and be snug enough to provide positioning and loose enough to be moved without binding at different spots along the bed. You might not even need this ways gap guide block but it is easily made and I think it adds a lot to the stability of things. The loading on the platform clamp mechanics will be minimal but the fastening method presents some options. You can bolt through the platform into clamp blocks. If you make the gap strip thinner than the lathe bed ways, you can use simple straddle blocks to fasten the platform to the lathe. Recessing any bolts from the top surface is a wise idea. You will want to preserve the completely open surface of the platform for the carrier travel and avoid any protrusions. Depending on your lathe and loading of the platform, you might find that a bed gap locating feature and a clamp or two will suffice.

The fastening methodology is up to you but I think at least two points of fastening are in order. Whether you decide to fasten from the



The table and carrier can be scratch built with scrap bits of plywood or even pre-built shelves from the local home centre. Very easily made in a woodworking workshop but also doable with only hand tools



A single piece of shelving can be used for the table. I've favoured a front side of the lathe only position table but the lathe bed gap locator can be centred for work on both sides of the lathe



With the lathe bed gap locator intentionally thinner than the ways, almost anything can be used to clamp the table in place from fender washers to blocks of wood to clamps for other lathe accessories



Since there is little loading on the table, you might find a squeeze clamp sufficient to fasten the table to the lathe bed ways. A good fit for the locator strip, or shorter blocks if you choose, secures the table nicely



Two shelves, a couple of lid supports, and your choice of hinge type will let you build a table that can be angled. It will require some centreline adjustability but extremely versatile arrangement

OUR PLATFORM (CONT.)

top down or the bottom up is your choice but do remember that anything proud of the table surface will probably interfere with things later on. What about the dimensions of your table? There is no reason to make the table purposed for operation on only one side of the lathe. Why not make it large enough that you can work from not only both sides of the lathe and also from the end? If you truly find

the centreline of the turning for your milling, drilling, painting, or whatever, you can swing around the far side with a continuous motion through the arc. While the table size shouldn't be unwieldy, the larger the better from my perspective. It certainly can have a myriad of other uses on the lathe from a tool layout table to being a platform for lights to see inside of the deep hollowing. If you desire to perform

angled cuts using this system, I'm certain you'll see the potential for an angled table by putting a hinge system on one end of the table and the angle fastening arrangement on the sides. Whether you opt for a single thickness platform or a hinged, double thickness, I think you'll find many uses for your platform in addition to the router table concept being presented here.

My slightly too long piano hinge attached to my two shelves create a table with angle capability. Notice the ability to move my gap locator allows the hinge to open from the other end of the turning



For the most part, a small angle of opening will suffice. Pre-drilling for multiple locations for the lid supports allows for larger angles or finer resolution when adjusting the angle and fastening

OUR TOOL CARRIER

With the table completed to your desires, the next task is the mount for your router or similar tool. I believe a right angle, sliding platform will be the most versatile method. As you use the tool, you'll be controlling the 'X' and 'Y' movement. The 'Z' position will have been adjusted and locked in place prior to use when mounting the tool.

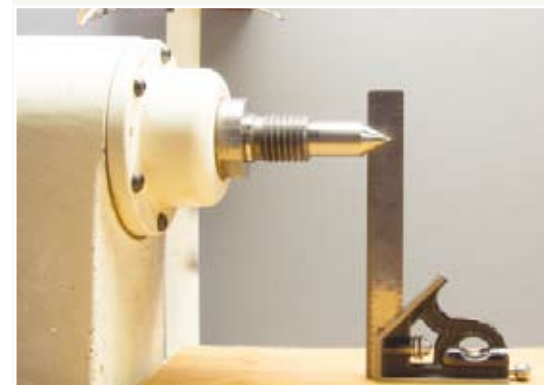
Since all of the tools you might use will vary in mounting needs, I think an interchangeable side bracket will allow for a host of tools to be brought into play. You'll also be able to adapt existing mounting systems for die grinders, Dremel or Freedom tools, routers and drills. You might be able to live with only one platform if your needs are simple or you make

your platform adaptable. If you will be using an array of different tools, you can easily make a specific side bracket for your needs to fasten to your platform. Once you've determined the proper centreline for the various tools, your platform can be the 'universal carrier' requiring only the specific adaptor to mount your tool.

Once the table is completed, single or doubled to be angle capable, a measurement of the height to the centerline of the turning is required. It is important that the tool carrier be planned to this height

Built from scraps, this tool carrier has plenty of 'footing' to stay level, be guided, or clamped on large or small tables. The hole pattern for my mini-router will fasten other adaptor plates to suit other tools

My 1hp Bosch router situated in the carrier with plenty of room for wrenches and adjustment. The side walls are simply glued up to double thickness using the same scrap plywood used for the base



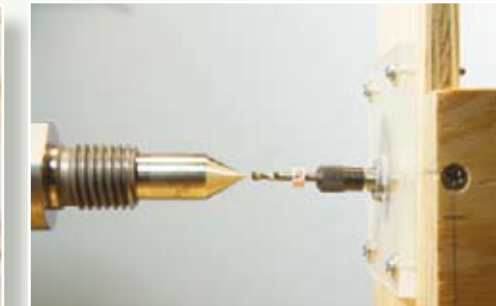
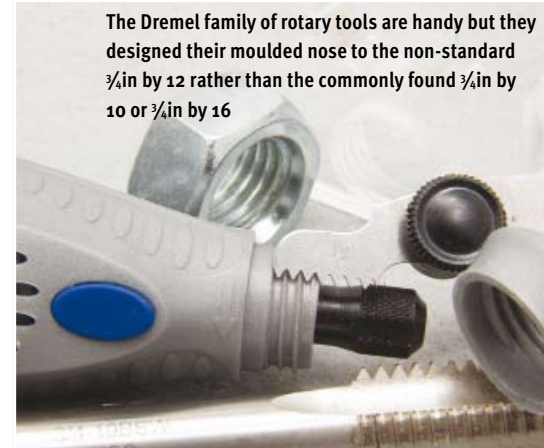
The Dremel family of rotary tools are handy but they designed their moulded nose to the non-standard 3/16 in by 12 rather than the commonly found 3/16 in by 10 or 3/16 in by 16

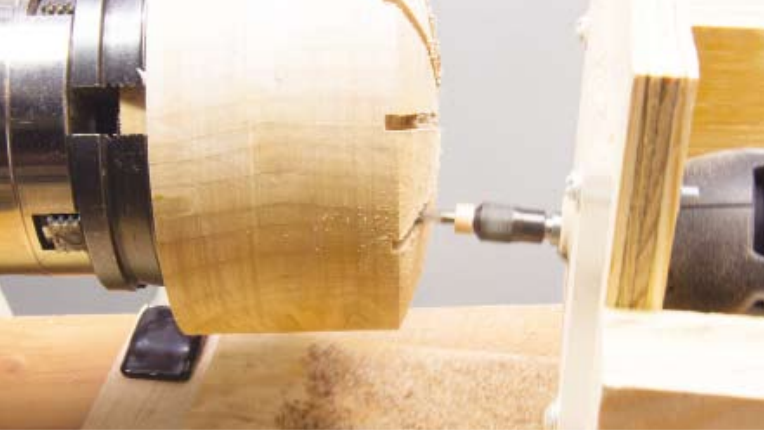


A Dremel tool can be 'coaxed' into a piece of plexiglass threaded with the common 3/16 in by 10. Though this system is not ideal, it will work as well as a split block clamp to swallow the neck



By designing and fabricating my Dremel adaptor plate to fit the hole pattern of the Bosch router base, I can position my Dremel to the same centreline as my router and any turning





By clamping a wood strip to control the depth of cut as desired and with the headstock spindle locked, any cutter type can be brought to bear on a spindle or faceplate style turning



The depth stop is especially important when working on curved turnings. The router base, which would normally contact and control depth of cut on flat surfaces, doesn't work on curved surfaces

◀ IN USE

Can you envision a wide array of uses for the table and sliding carrier with a router mount? There certainly are grooves and slots that can be cut both parallel to the axis of rotation as well as at an angle to that axis. You can also clamp your tool carrier to the platform if you intend to rotate the work via the handwheel while creating rotary tool alterations. Since you can cut rotationally with the traditional woodturning tool, most features can be created by woodturning. However, by clamping the sliding router mount into place, you can perform rotary operations as well with the cutter form you wish. From a safety perspective, I highly

recommend rotating the turned work via the handwheel rather than under lathe power when performing radial operations. Also, with any of the operations, speeds and feeds – including the depth of cut – need to be tempered with safety in mind. You will have a rotating cutter under power with no constraints other than your grip on it. Be cautious in the demands you make of it. Make multiple passes increasing depths as is safe. Guide rails can be clamped to the your table to provide linear guidance and/or depth control. This depth control capability will be important for curved surfaces since your carrier face will not provide accurate depth control. Convex

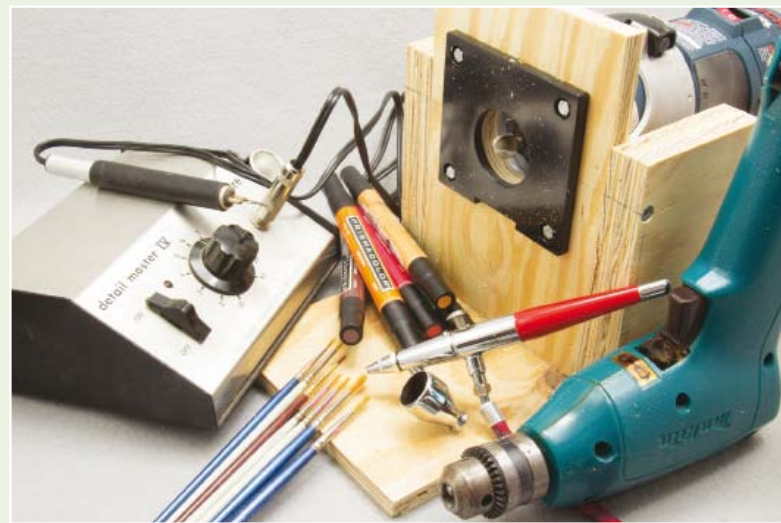
surfaces are pretty easily handled. Concave surfaces require some special handling. A depth control attachment that the cutter protrudes through and will track the surface is required. Doable but a bit more complex – we'll explore concave surfaces and a host of expanded opportunities for this concept in a future issue. Please don't overlook the rotation of travel of your cutter! Depending on the cutter you are using, you may have an up cutting or down cutting action so your direction of travel will make a difference. Just like working with flat wood, your forces and cutting result will vary with direction of cutter movement.

CONCLUSIONS

The table and sliding platform is an idea that can be further developed. Your lathe has potential far beyond just spinning work for your turning activities. You don't need to only use it for cutting operations. It is a wonderful workholding device for subsequent operations. This simple platform and tool carrier idea should open a huge array of after-turning possibilities for you. While we've created the Spartan version here to plant the seed and be practical for those without a host of woodworking tools, there is no limit to how exotic you can make your version. Why not embed 'T' channels for a clamping system? Why not make your bed gap block be adjustable to suit any lathe you have in your shop now or in the future?

Since it can perform in linear and rotary operations, why not create a pen or brush holder. You'll be able to more precisely control your application of artistic after-treatments by fastening your applicator as opposed to freehanding it on the toolrest. Where can you take it next? You can create cradles for air tools as well as electric tools. Why not create a mounting system for your pyrography handles, paint brushes, coloured marker pens and more? A simple 'V' block, at the appropriate height, on the side wall of your carrier will mount round items for use. Brushes and pyrography pens can be

mounted on the side of the carrier simply with cable clamps. You can drill or sand with your Dremel, Foredom and die grinders. Why not make a mount for a pistol drill which will allow for decoration as well as precise angular drillings? An easy way to drill your stool seats to ensure identical leg insertion geometries? You've got the basic concept, now see how far you can take it. ●



By making appropriate mounts for your carrier, or making a special carrier, there really isn't a limit to what you can now bring into play on your woodturning creations



A simple bowl displaying a rotary cut, straight axial cuts, and slightly angled axially cuts with a cove router bit. What can't you bring to bear and where will you take the idea?