



POWER WRAPPER Variable Speed Foot Boards

Kicking a variable speed control along the floor seems part and parcel for most rod builders who opt to work with a power wrapper. It's one of those things that at some point you just get used to, all the while thinking there must be a better way, and when you have time you'll certainly conjure something up. Well, let us do that for you right here in these pages, now!

The basic assembly still utilizes your power wrapper's supplied variable speed foot control, mounted stationary and connected to a foot board which runs the full length of your lathe. Between the two are a simple series of pulleys and ropes/lines.

The footboard is hinged on one side, lower or upper, and connects via a short length of no-stretch cord through a pulley system that operates a standard variable speed foot control (1). The end result is a system that allows instant speed response anywhere along the bench.

Because of the many variations in benches, foot controls and personal preferences, construction of a foot board is one area where you need to be flexible and creative. There is no single plan or set of instructions that will work for everyone and in every situation. Let's take a look at how we handled the task of creating a foot board on our particular bench.

Instant Response

Do the length involved, it is vitally important to construct the foot board itself in such a way that flex and twist do not enter into the equation. Ideally, you'd like to mount your foot control and pulley/linkage system midways on the foot board so as to reduce the distance between your effort and the speed control thereby keeping flex or twist to a minimum.

In our case, it wasn't possible to mount the foot control and pulley/linkage system midways on the foot board as other items we'll be adding to this bench require that center area to be left open. Thus, we were forced to locate our speed control at one end of the bench. So when working near the tip end of a rod, we'll have about 6 feet of foot board length which can introduce twist and flex before our effort will reach the speed control unit. In order to keep speed and response consistent all along the length of our foot board, any possibility of twist or flex must be removed. One way to take care of the matter would have been to simply utilize a stout 2x6 or 2x8 lumber joist. But either of those would be extremely heavy and we plan on adding so much more to our bench as we go along that we preferred to try and keep things as light as possible in the way of the foot board. So we used a light pine 1x6 and backed it along the full length with 1 inch aluminum square (2). This created a very lightweight foot board that has almost no twist nor flex even when operated at the far end of the bench.

We sprayed the face of the foot board with Krylon nonskid spray and mounted it via a strap hinge at either end, to the same 2x6's that our bench and wheels are attached to. Two common tension springs, one at each end, keep any weight from the board from pre-loading the speed control. This may be an important part of any such system you construct to remember these board weight carrying springs if you encounter stationary loading problems or "auto-on" operation!

Foot Rest

If you want to be able to operate your foot board smoothly and easily, you will either have to rest your heel on the floor, or in the case of a higher bench like ours, create a foot rest all along the front of the foot board. Just in front of the foot board, you'll notice a length of steel pipe. The pipe performs double duty as a foot rest when not using the foot board and as a place to rest your heel when pressuring the foot board with your toes (3). We used a section of galvanized fence pipe. Other stiff and sturdy materials could function just about as well provided they are able to bear the weight of your feet while sitting at the bench.

Pulley/Linkage

Here's where the rubber meets the road. There are two ways to connect your foot board to your speed control. One, is to use a solid, hinged linkage. Such will certainly work and requires less effort to fabricate, but unless it is perfectly designed and implemented can be just a bit clunky in use. On the other hand, a pulley system fitted with true "no-stretch" cord is smooth as silk, extremely responsive and can be designed to provide a great deal of resolution by the simple addition of more pulleys. The cord also gives just the tiniest bit of cushion to the entire system but again you must employ true "no-stretch" cord or you'll find that your foot board will seem sluggish or somewhat non-responsive.

In our case, we had to shoehorn the pulley system into a very small area. We did manage to employ two pulleys, which gave us a little mechanical advantage and added some additional resolution to the entire system (4). Stepping on the foot board provides immediate response, but won't send the rod on a wild ride if a "lead foot" climbs on board. Speed control across a wide range is truly excellent. Better, in fact, than any stand-alone variable speed foot control unit we've ever tried.



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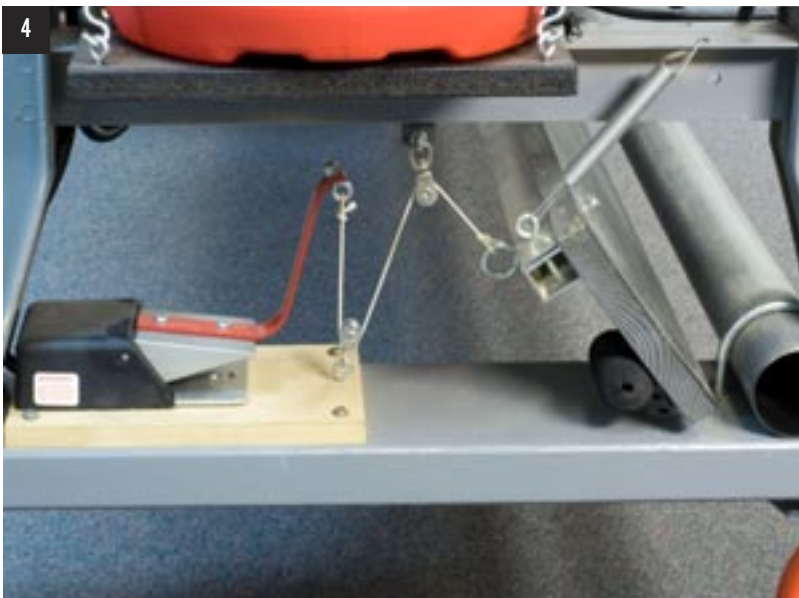
A common hardware store turnbuckle is often useful. It allows you to fine tune the response of your system as well as make quick adjustments for any seasonal changes to wooden components in your system. Just a quick turn one direction or the other instantly quickens response or adds just a bit of slack and delay. If the room to install one on our no-stretch cord system had been possible, you can bet we'd have one in there.

Angles and Such

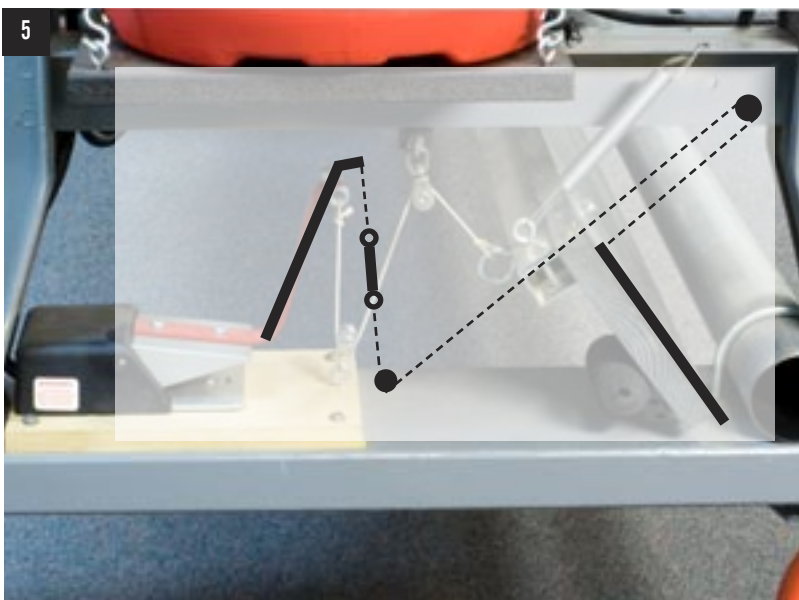
A well designed pulley or linkage system that provides immediate response and consistent speed increase as you depress the foot board requires an eye on the various ways that all the interconnected parts move. Few move in a straight line. As you look at the system we're using in photo 4, it might appear that certain angles aren't correct - that things won't move in a consistent fashion and that speed consistency will be compromised. However, a closer look reveals a foot board with an attachment point for the pull cord that moves in a bit of an arc rather than straight down. Likewise, the extension we've fabricated for the foot control can't move straight down since it's securely fastened to the foot control pedal with screws. A certain angle and allowance for the inevitable motion in an arc had to be allowed for. The end result is a speed control system that is extremely smooth and consistent. Nothing binds, nothing fails to work in unison with the other pieces.

There are other designs you can play around with. On our own bench another good design would have been something like that shown in illustrations 5&6. A turnbuckle would have been employed in this instance - always a good thing in order to allow for extremely fine tuning the response of the system. However, it is nearly always better to mount any such turnbuckle *in the vertical plane* so that its weight does not create slack in the cord nor the need for too much preload in the pulley-linkage system.

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Other Designs

Looking to photo 7, you will see the design employed by rod builder Buddy Owens for his own homemade bench and speed control system. If you can mount the foot control high on a bench leg or support as Buddy has done, this is an excellent design. I have used his system and can attest to the excellent response and control it offers. Although his hasn't needed one, you could very easily incorporate a turnbuckle into Buddy's type arrangement for even greater fine tuning.

The particular bench you buy or build will dictate what type speed control system you have to design and use. Just pay attention to the direction or angle of movement that the foot board and foot control pedal make and try to arrange a system that allows them to move freely in those directions.

Design + Materials

Finally, a few words on materials and designs used in your bench, foot board and pulley-linkage systems. When deciding what pieces to use and how to employ them, you must play to the strengths of the materials and do your best to avoid their weaknesses. For instance, we had to raise the height of our speed control foot pedal in order to be able to pull it from below. We also wanted to gain a little bit of added leverage in order to overcome the very stiff spring action of the foot control. The answer was found by bending a piece of steel flat in such a way that the top attachment point was elevated by several inches and which also served to extend the foot control “lever” by a couple inches. But, had we done this exact same thing with a piece of say, aluminum flat, the flex created by working with that material in that same position would have resulted in unwanted flex and the loss of some control and response in our overall system. Think about a 2x4 on flat and on edge, and in which direction it will withstand the greater load.

When you fabricate items for your pulley/linkage system, you’ll want to employ the right materials for the particular design you’ve decided upon. On our system, the need to use the piece on flat, rather than on edge, necessitated that we use a very stiff piece of steel, rather than aluminum. If allowed more room, we would have preferred to employ a lighter aluminum flat. But had we done so, we’d most likely have put a 90 degree twist in it as it came off the foot control so as to put the load on edge, rather than on flat, in order to remove any flex from the piece. Get it?

Hopefully, custom rod builders will be able to look at the system they’ve designed and select the right pieces/materials to implement it with. Or... utilize the correct design for the pieces/materials they’ve decided upon. A well designed foot board is a true joy to use. Designed and implemented properly, it works so very well that you’d be hard pressed to ever bother with a simple kick-along foot control again! The key is in a good design and proper use of materials and structures that give you that instant response and a wide range of speed control. *Tom Kirkman*

