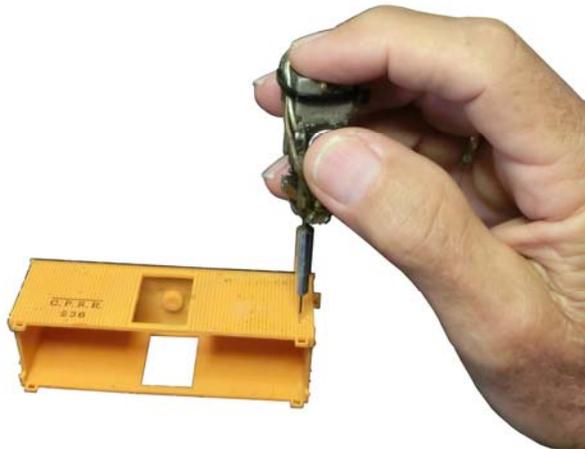


## Miniature Drill Fills the Bill!

By Gary Butts, MMR

During the quest for my NMRA Civil Engineering Achievement Program certificate, it became apparent that I was going to have to actually hand-lay some track. Not just track, mind you, but turnouts, crossings and the like. Well, that didn't seem *too..* onerous?. Since my current layout did not need any additional track at the time, I figured that I would just lay the required trackage on a board and after adding ballast and a little ground cover, I would take it to a PSR meet and have it evaluated. All went well with the initial construction until it came time to start spiking the rail. I elected to use fairly thin ties to minimize the amount of ballast required and I found that even with the smallest scale spikes I was using, the ties tended to split. Not good. With some 1500+ spikes to set, splitting ties was not an option.

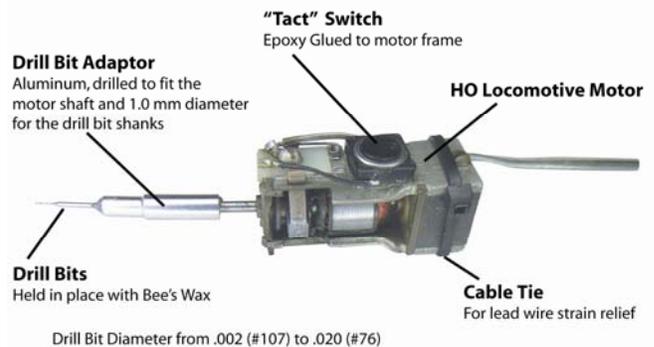
The normal fix for fastening into splitting prototype wood is to first drill a pilot hole for the fastener to remove some of the parent material and reduce the stress on the wood. Following that idea, I found that after drilling the ties with a .013" diameter drill mounted in a pin vice the problem of splitting ties went away. However, 1500 holes with a pin vice? While looking for a way to reduce this effort I came up with a very miniature electric drill that worked great for my trackage project and has gone on to be one of my most favorite and most utilized tools.



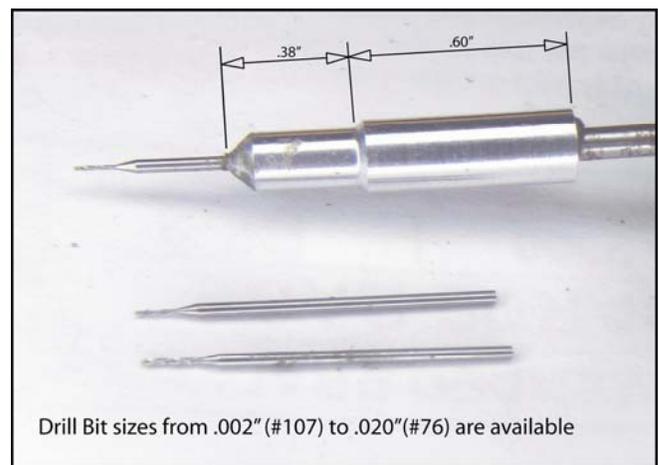
Drilling mounting holes for grab irons

McMaster-Carr Industrial Supply ([mcmaster.com](http://mcmaster.com)) has a line of cobalt drill bits ranging from 0.002" up to 0.020" diameter, all having the same 1.0 mm (0.039") shank diameter (p/n 8904A11 thru 8904A61). These bits aren't inexpensive but made

from cobalt steel, they stay sharp until you inadvertently break one. I just needed some way to turn these bits in a fairly precise way and not have a large drill motor with its inherent weight and cumbersome size to deal with. After breaking a couple of these bits trying to use my Moto-tool, I hit upon using an old HO locomotive motor as the driving force. By gluing a "tact" switch to the side of the motor and making a simple adaptor for the shaft to fit the 1 mm shanks of the McMaster drill bits, I made a light, small, and nimble drill motor that has served me well in my modeling ever since.



Although perfect for drilling ties, I now use the drill to make a starting hole for almost every hole I drill in my models. Holes for grab irons are precise and done in a second, larger drill bits form the holes for larger added model details. If I need still larger holes, I still use the small drill prior to the large bit and Pin Vice to make a pilot hole for the larger bit. This pilot hole greatly reduces the time required to drill the larger hole and gives me a more precise hole location as well.



Applying the drill bit drilling pressure to the back of the motor, on center and in line with the shaft of the drill bit with one of my fingers, has all but completely eliminated broken or bent drill bits. I use an old

model railroad DC power supply (we all have one of these things laying around somewhere) to give me a variable drill speed to suit whatever material I am drilling.

You can find most of the materials to build one of these drills on-line and in your junk drawer. "Tact" switches are available from Mouser.com (688-SKHCBFA010) and most other electronic supply outlets. You will have to make the drill adaptor, and a lathe is probably the easiest way to make it. If you don't have access to a lathe you may be able to make an adaptor from telescoping brass tubing. The drill bits are held in the adaptor by Bee's Wax so you need about 3/8" of hole depth in the adaptor for the drill bit shanks. I glued my adaptor on to the motor shaft with epoxy.

Changing bits amounts to pulling the old bit out, spreading a little bees wax on the new drill bit shank and inserting it into the adaptor. I haven't had any problem using drills up to .020" diameter with slipping in the wax.

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