

Notes for Building a Milling Machine Cabinet

Foreword

Someday we'll finish these notes and the associated drawing to make them a complete plan set. At the moment, all we have are these design notes, some in-process photographs, and the associated drawing.

Design Features

The cabinet is designed to provide support, coolant management, and storage space for a small vertical mill. The design is open enough to allow easy access for tool changes and setup, yet provides a high level of containment for chips and coolant. This is an intermediate design, between a fully enclosed cabinet, typical of a CNC machining center, and an open frame machine similar to a Bridgeport. The design is probably best suited to milling operations associated with short runs or manual operation as is common with maintenance, repair, education, or engineering development.

Other features include easy relocation with a lift truck, pallet jack, or the simple dolly included in the instruction sheet.

The cabinet is suitable to support a machine tool weighing as much as 1200 lbs.

Tools & Skills Needed

The cabinet is essentially a woodworking project and no special skills are required. Suggested tools include:

- Table saw
- Drill
- Router
- Sander

Method of Construction

The cabinet is a composite design using dimensional lumber, mainly 2x4's and 3/8" plywood. The dimensional lumber takes the majority of the load while the plywood skin provides lateral stability and keeps it all together. Assembly can be done with glue and sheetrock screws, or simply with glue and staples from an air nailer. Do not try to build the cabinet without glue.

The cabinet is finished with plastic body filler (aka: Bondo), primer, and paint. The finishing operations are important to the appearance and durability of the cabinet. With a little care, the cabinet is indistinguishable from a commercial steel cabinet.

Procedures

Cut out all of the pieces in the cut list. Each piece is shown in the appendix drawings. Note that the openings for the coolant drain, doors, and lift truck fork

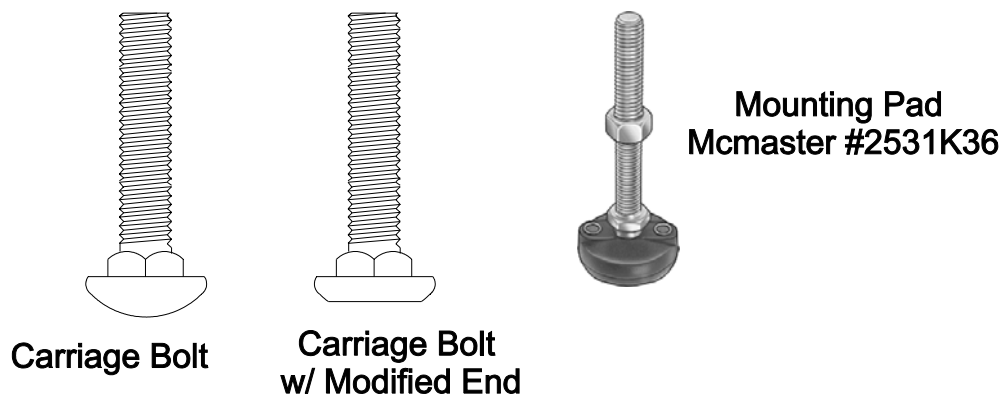
holes are not cut out. Those openings will be cut out later with a piloted router bit.

Using glue and screws or staples, fasten the vertical posts and horizontal supports to the front and back panels (figure xxx). Also fasten the lower cross bars to the cabinet bottom.

The recommended machine feet are simple $\frac{1}{2}$ " carriage bolts, held into the 2x4 with a large tee nut.

McMaster 90598A033

If you have a metal lathe, you can reduce the contact pressure on the floor by flattening off the round top of the carriage bolt. If you are planning on placing the machine on something other than a concrete floor then you will want to place some plywood pads between the feet and the floor. An alternative is to else use a commercial machine foot similar to the one shown (McMaster 2531K36). The more expensive vibration absorbing machine feet are generally not necessary since the wooden cabinet absorbs a good deal of vibration.



After the glue has dried, the front and back can be assembled to the cabinet bottom and the remainder of the cross bars. The feet should be in place, with the cabinet floor slightly elevated. The general assembly is shown in figure xxx.

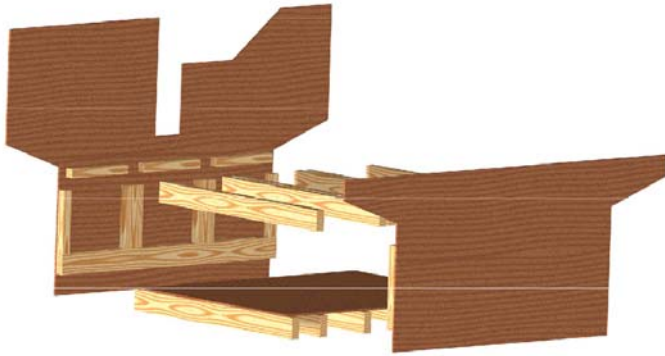


Figure xxx shows the framing members only, without the plywood skin. Note the callouts where it states “NO GAPS”. If these joints are tight, with close contact, then the weight of the machine will be carried through those pieces. If there are gaps then the weight of the machine will be carried through the plywood skin, resulting in a flexible cabinet and potential buckling of the plywood.

