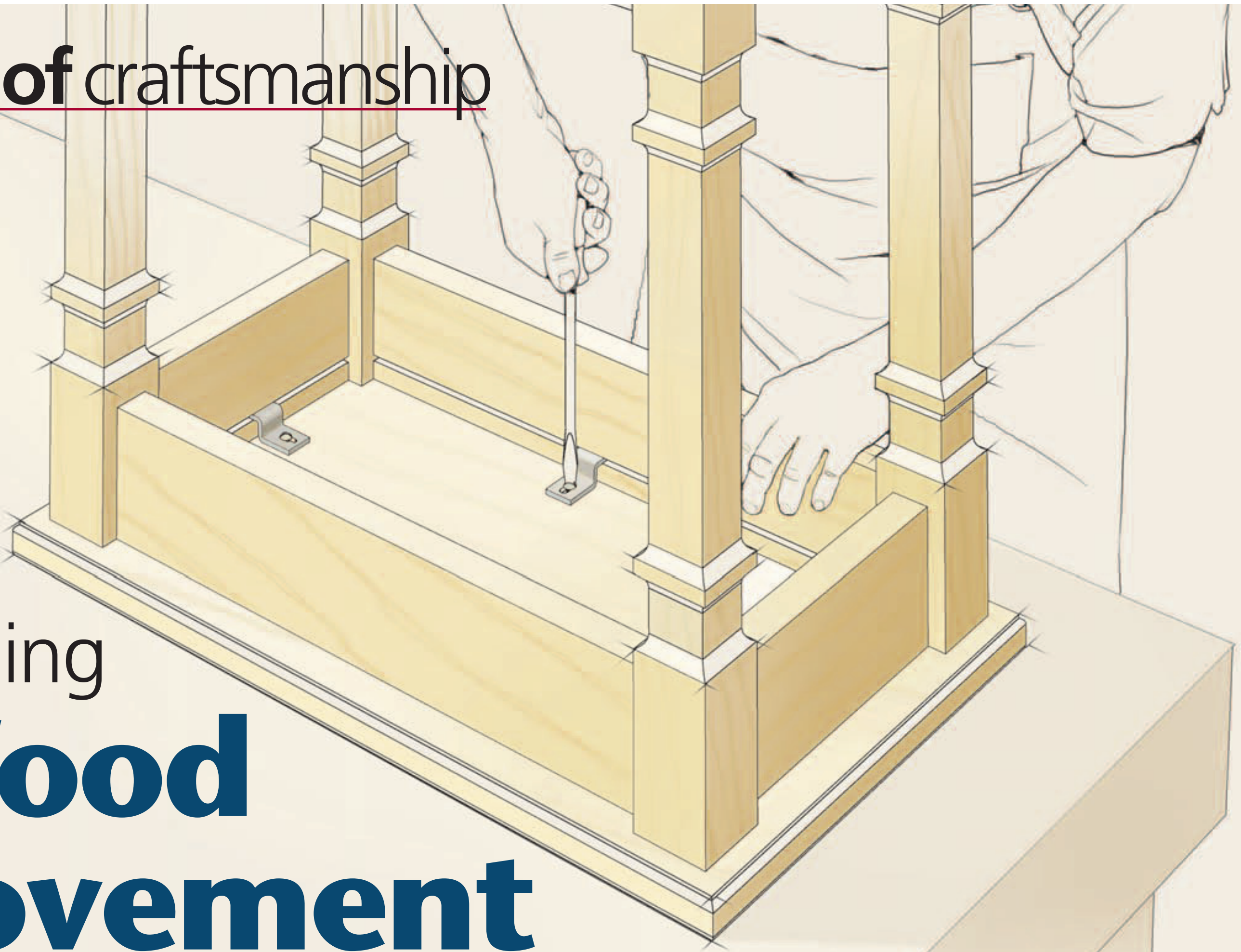
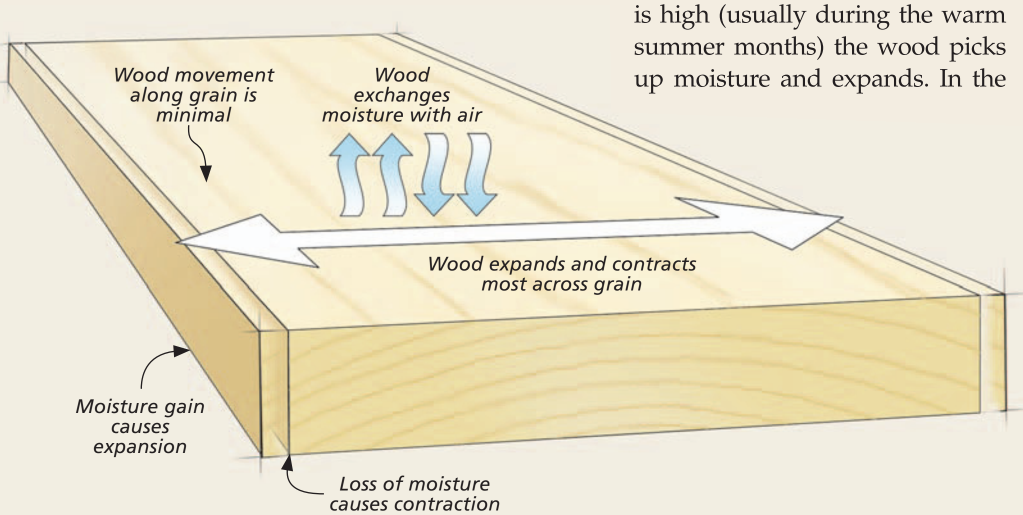


managing Wood Movement

You can't stop it but you can learn to build around it. There are a host of tried-and-true ways to avoid problems with wood movement.

When I first took up woodworking, I had only a rudimentary and naive understanding of wood movement. I knew that wood swelled and shrunk with changes in its moisture content, but I assumed that this tendency could be controlled with a tight joint and plenty of glue. I quickly learned that dealing with wood movement isn't so simple.



The real solution to the "problem" of wood movement runs more along the lines of the old saying "if you can't beat 'em, join 'em."

HUMIDITY. The culprit behind wood movement is moisture in the air. The moisture content of wood changes to stay in equilibrium with the moisture content of the air around it. When the humidity is high (usually during the warm summer months) the wood picks up moisture and expands. In the winter months when you're heating your home and the air is drier, the wood loses moisture to the air and begins to shrink.

This constant expansion and contraction could be problem enough in accurately fitting parts. But when you add in another twist, things get more complicated. Wood shrinks and swells mainly across the grain but very little along the grain. This means that the dimensions of a board will change in thickness and width, but not length.

The challenge here is that building a project often requires assembling parts crossgrain or at right angles. This means that one piece will move while the other will not. And if this isn't factored into the joinery, problems can arise.

But this is nothing new. There are many effective ways to manage wood movement. On the following pages, I'll show you eight techniques guaranteed to work.

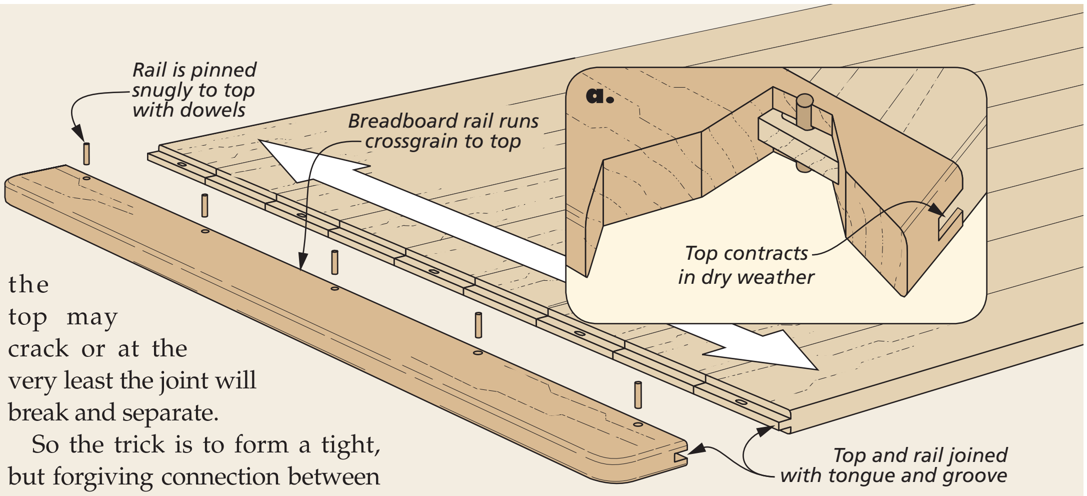
Breadboard Ends

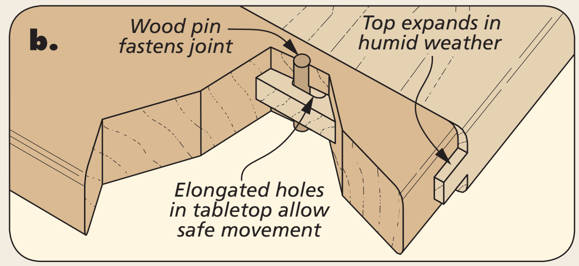
Breadboard ends are simply wide rails attached across the ends of a tabletop (or a breadboard). They serve to keep a wide top from cupping and can also be used as an interesting design detail.

But breadboard ends do have one drawback. The length of the rail will remain constant but the width of the top it's attached to won't. During a dry cycle, the top can shrink to leave the ends of the rail proud (detail 'a'). More humid times will have the opposite effect, as shown in detail 'b.'

This is only a problem if the joinery you use to connect the top and rail doesn't allow this movement to occur. If the joint is glued rigidly, the top may crack or at the very least the joint will break and separate.

So the trick is to form a tight, but forgiving connection between the top panel and the breadboard rail. The drawings show how this is done. First, a snug tongue and groove joint is formed between the rail and the top. Then the joint is pinned with dowels through elongated holes in the tongue. The top is free to expand and contract while the joint is held tight.





Tabletop Movement

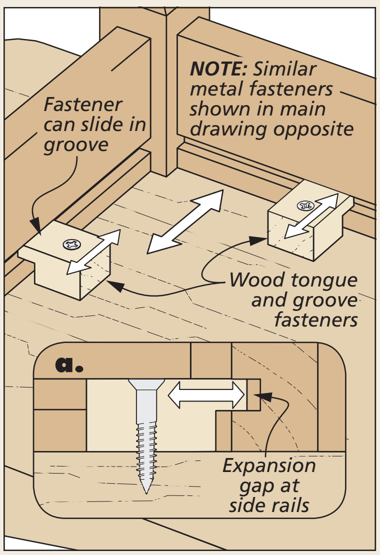
Even a small tabletop is going to shrink and swell across its width. The trouble is that the base you want to attach it to won't move. Its dimensions are defined by the stable, long-grain apron rails.

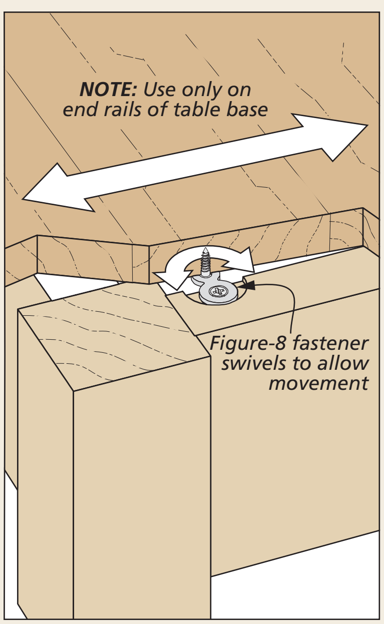
So something has to give. And this is exactly the approach you need to take when fastening a tabletop to its base. You have to attach the top flat to the base in a way that allows it to shrink and swell without causing problems.

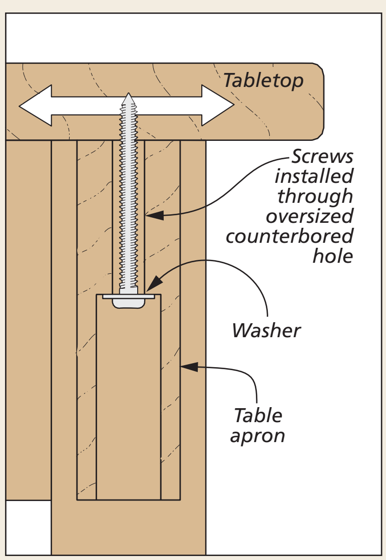
As the examples here show, there are multiple proven methods of accomplishing this. The drawing at left and the drawing at the top of the opposite page show one of the most common. A groove is cut in the rails that accepts tabletop fasteners. The flange on the fasteners clamps the top solidly to the base while still allowing it to move freely side-to-side.

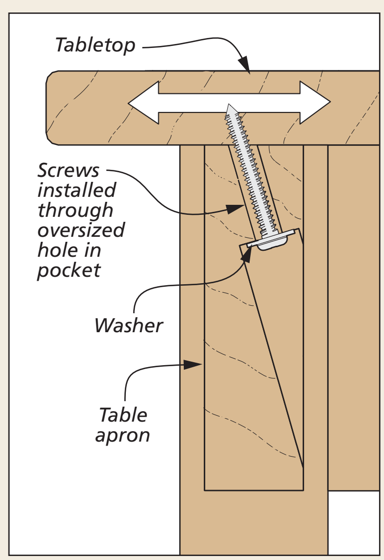
A different type of fastener is shown at lower left. These figure-eight fasteners are set into a shallow counterbore in the end rails of the base. As the top moves, the fasteners simply swivel along with it.

The two lower right drawings show one of the oldest methods of attaching a tabletop — with screws inserted through oversize holes. The oversize holes provide wiggle room that allows the screws to shift with movement of the top.







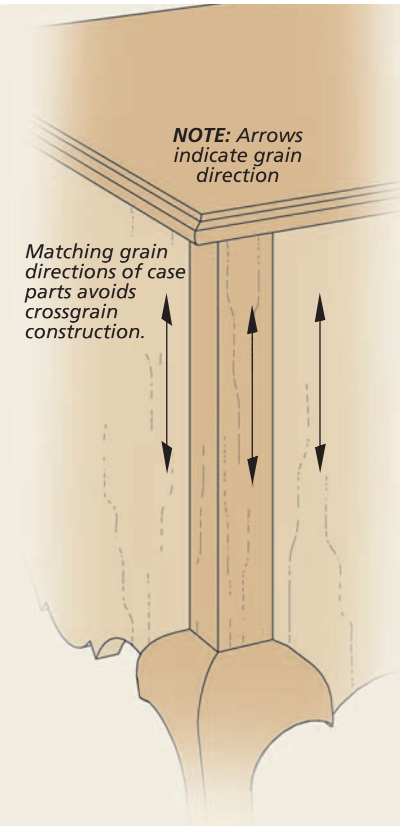


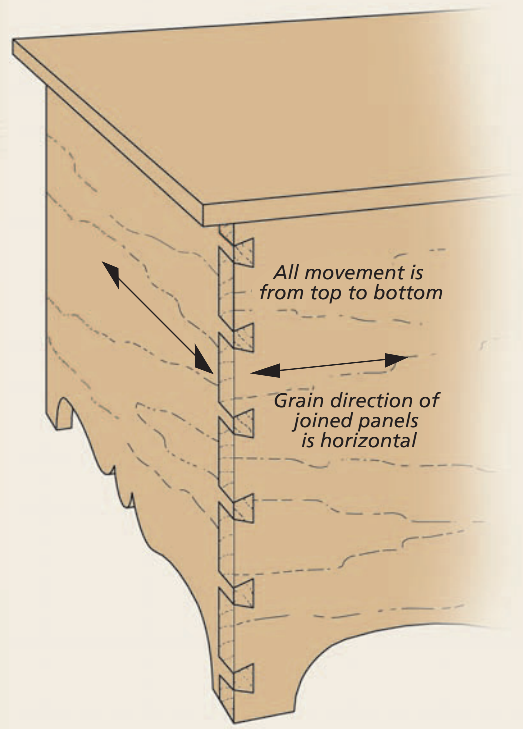
Case Construction

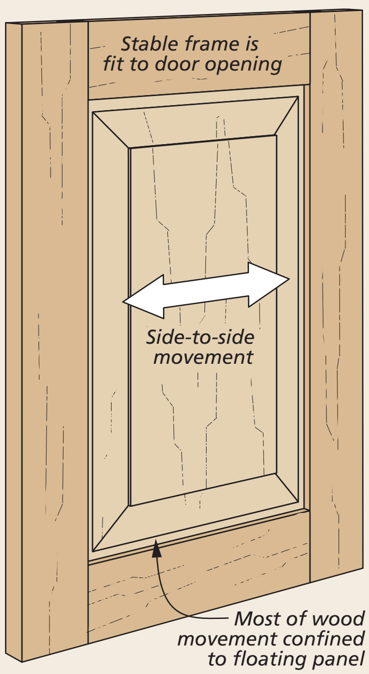
If you want to build a solid-wood case that lasts a lifetime, you need to keep the grain orientation of the parts in mind. The goal is to avoid crossgrain construction that might cause joint failure or cracking.

Two good examples are shown at right. The lowboy at near right is built with the grain of the sides and back running vertically. This matches the grain direction of the leg they're joined to. Furthermore, the top and the sides are oriented to move in the same direction.

The grain in all the panels of the chest at far right runs horizontally. The panels will shrink and swell together from top to bottom without causing problems.

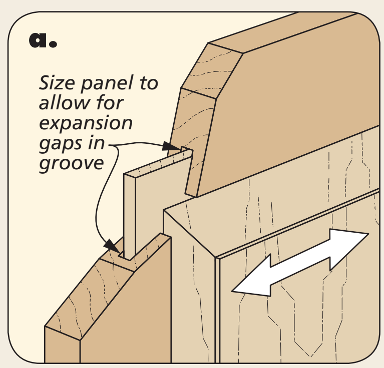






Frame & Panel Door

Frame and panel construction is a common and very effective way to deal with wood movement when building and fitting cabinet doors. The principle is really pretty simple. You control the unavoidable crossgrain movement in the door by confining it to a panel installed in grooves in a rigid frame.



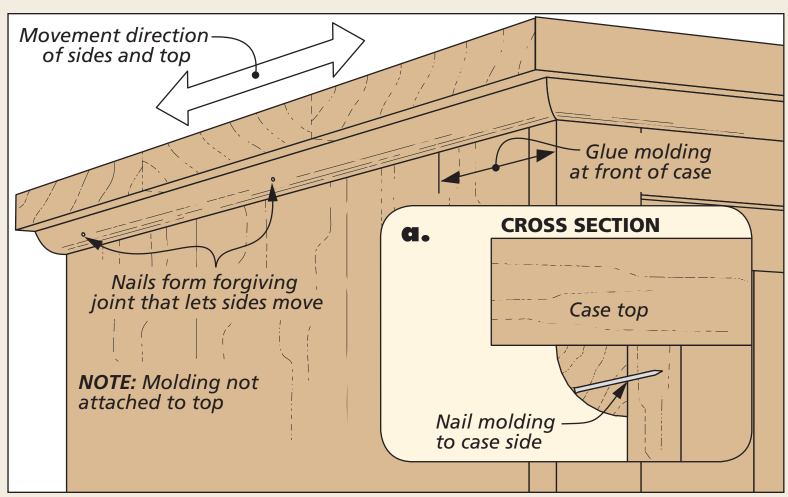
The dimensions of the frame are, for the most part, defined by the stable long grain of the narrow stiles and rails (far left drawing). Unlike a solid-wood slab door, this rigid frame will experience little wood movement and the fit will change little from season to season.

Most of the wood movement in the door is limited to the solid wood panel fit into grooves in the frame, as shown in detail 'a.' The panel is sized to leave a small expansion gap in the grooves and is not glued in place. This allows it to expand and contract freely without affecting the fit of the door.

Attaching Molding

A molding running crossgrain to the sides of a case can spell trouble if not installed properly. Gluing the molding in place would constrict the movement of the side, causing it to crack or break the glue joint.

Instead, use a combination of glue and nails to fasten the molding (right drawings). Glue the first few inches to hold the miter joint tight. Then nail the remaining length of the molding. The nails will "give" enough to avoid a problem.

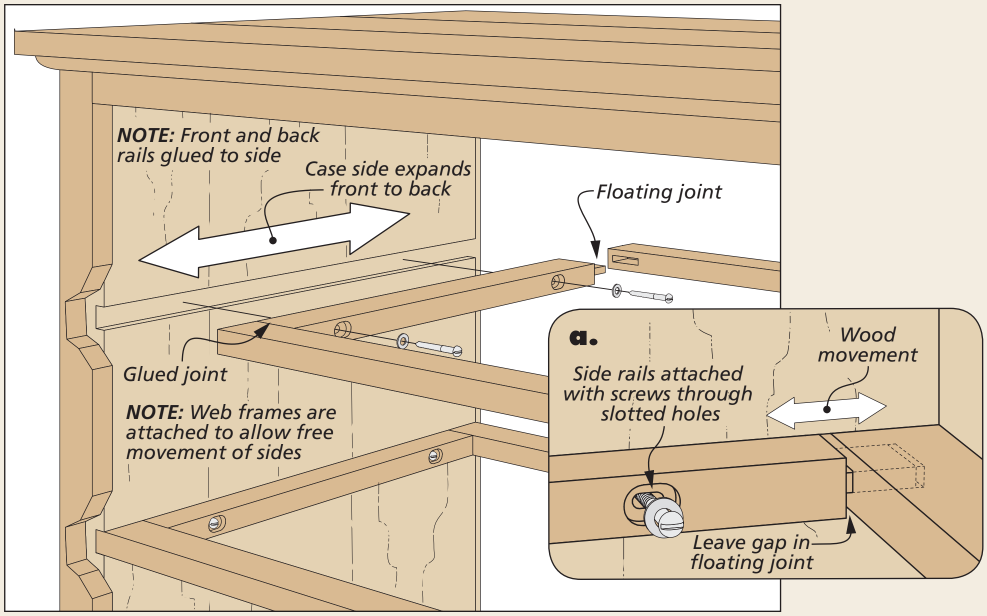


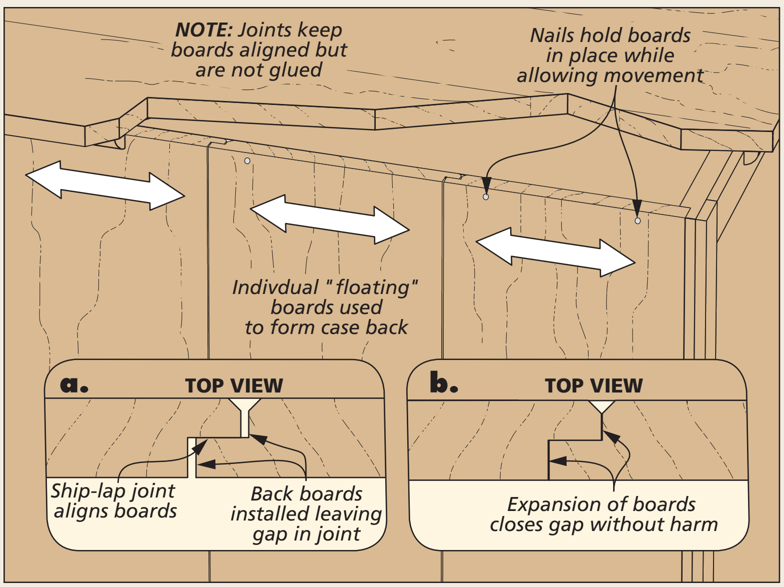
Web Frames

Web frames are a great, lightweight option to solid-wood dividers. The only catch is that a web frame has to be attached in a way that still allows the side to move.

The drawings at right show the secret. You build the mortise and tenon frame about ⅛" less in depth than the case sides. I glue the front mortise and tenon, but the back joint is left to float.

The frame is glued to the sides at the front. But screws through slotted holes form a "moving" rail-to-side joint. Finally, the back rail is glued to the side, leaving an expansion gap in the joint.





Floating Back Boards

I've always believed that a traditional case project built from solid wood deserves a back to match — solid wood. But the large amount of wood movement across a solid back panel would be problematic.

The solution is simple. You make the back from individual boards that are joined, but not glued, together, as shown in the detail drawings. A ship-lap or tongue and groove joint between the floating boards keeps them aligned while still allowing expansion and contraction. And a molded edge on the boards can add a decorative effect.

Fitting Drawers

Wood movement should always be factored in when sizing a drawer to fit its opening. The width is going to stay constant, but the height will change with the season. Unfortunately, there's no magic "drawer gap" formula, but there are some guidelines you can use to avoid sloppy or sticking drawers.

First, you need to take the time of year into consideration. A drawer built in the drier season will need a larger gap than one built during a more humid time of the year.

Second, the height of a drawer affects the size of the gap you need to allow. A tall drawer will move more than a narrow drawer. W