



# Build Lighter, Stronger Furniture

I think many woodworkers forget how strong wood truly is, especially the hardwoods. This leads them to make furniture that is unintentionally stout and heavy. Muscular furniture can be attractive, but I prefer the grace of pieces that are visually more delicate. To achieve that appearance, I take advantage of the wood's strength, designing in a way that pares down the physical and visual weight of a piece without compromising its strength. It's an economical way of building where each joint and every part is used to its full potential to strengthen the piece as a whole.

Through the years I've developed several strategies for building light and strong. One way to shed visual weight without los-

Use thin parts and innovative joinery  
to make light, durable pieces

BY GARRETT HACK

be stronger—make the top and bottom shoulders of a tenon smaller, for example. I'll explain these strategies and a few others. Of course, I don't use every one in every piece of furniture that I make, so I'll show you four different pieces and explain how I was able to make each one more delicate and graceful without compromising its strength.

*Garrett Hack is a contributing editor.*

ing strength is to make a part thin and wide rather than thick. You can also minimize the number of parts in a piece by making one part do many jobs rather than having many parts that do one job each. Or you can replace one big part with two or more smaller ones. Another approach is to redesign the joinery to



A wide taper on its underside makes a top appear thinner.

Make a rail look thinner by chamfering or cutting a bead on its bottom edge.

## Make skinny stronger

Case pieces have many parts, such as drawer rails, that have only one visible edge. These parts can be made to look more delicate by making them thinner. To maintain their strength and stiffness, make them wider. As you never see the part's width, this doesn't affect the case's visual weight. Casework can also be made stronger by integrating the parts more effectively. This might mean creating a better connection between drawer rails, runners, and guides, or using the guides and runners to reinforce the connection between the case front and sides.

### GO THINNER AND WIDER

Kickers, dovetailed to back apron and tenoned to front rail, tie front to back. They also get screwed to top to add rigidity to case.

Sliding dovetail locks divider to rail.

Thin, wide top rail helps tie front to case side.

Screw drawer rails to top to add racking resistance and stiffness to case.

Arched cutout in divider allows drawer guide, which is glued to bottom runner, to extend over top of rail, making rail-to-runner joint stronger.

Tenon joins drawer runner to rail.

Rail's beaded front edge appears thin and delicate, but is plenty strong.

### TIE THE FRONT TO THE SIDE

Runner is tenoned to rail and glued to guide, and both are glued and screwed to case side.

Bottom rail is joined to leg with double tenon, but also wraps around back of leg, where it's mortised for drawer runner.

# Get more muscle from joinery

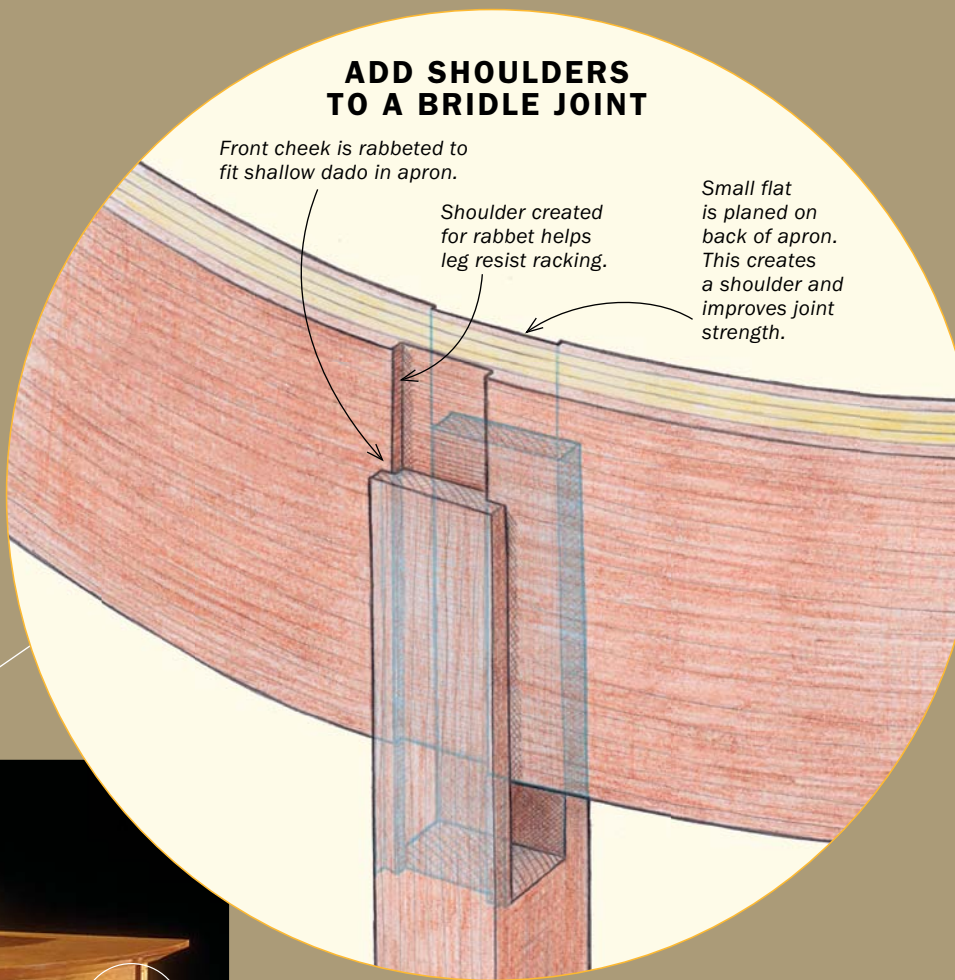
Sometimes all it takes is a slight change to greatly improve a joint's strength. For instance, add shoulders to a bridle joint and it resists racking much better. And if the joinery is stronger, the parts it joins can be lighter.

## ADD SHOULDERS TO A BRIDLE JOINT

Front cheek is rabbeted to fit shallow dado in apron.

Shoulder created for rabbet helps leg resist racking.

Small flat is planed on back of apron. This creates a shoulder and improves joint strength.

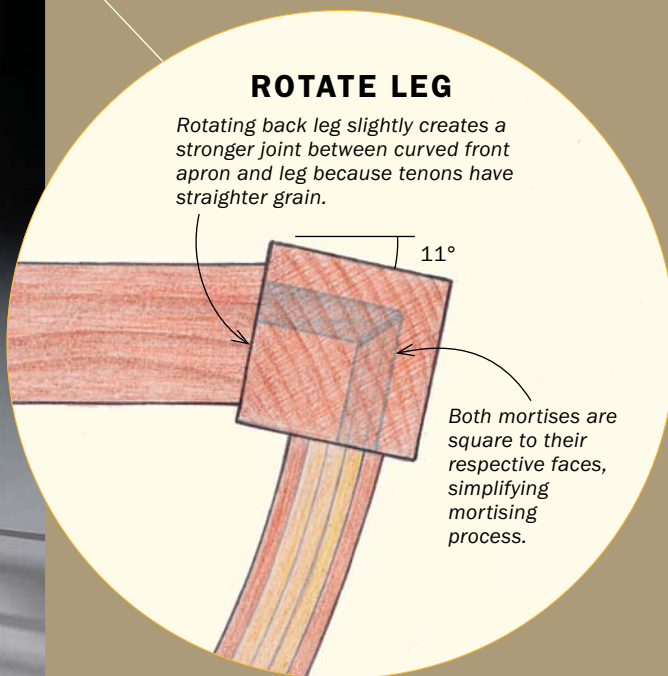


## ROTATE LEG

Rotating back leg slightly creates a stronger joint between curved front apron and leg because tenons have straighter grain.

11°

Both mortises are square to their respective faces, simplifying mortising process.



Glue cock beading to apron edge to add strength without adding mass to apron.

Use string inlay on legs to give them a longer, finer appearance.



# Force one part to do many jobs

An effective way to shed visual weight from a piece of furniture is to reduce the number of parts in it. Instead of having one part for each job, make one part do several jobs.

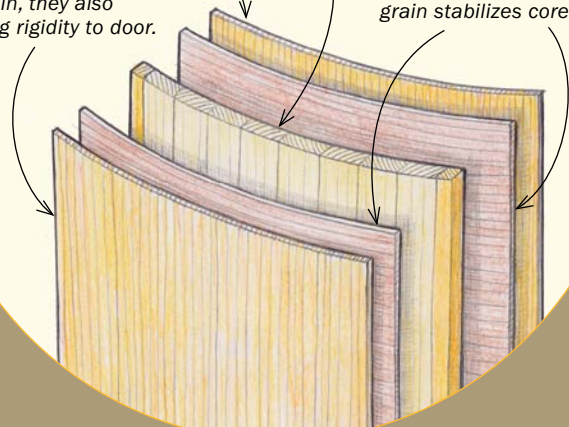
Not only does center shelf serve as top rail of drawer pockets, but it's also integrated with shell and legs, adding strength to case.

## MAKE A CURVED DOOR STRONGER

Show veneers aren't just for looks. Glued parallel to core's grain, they also bring rigidity to door.

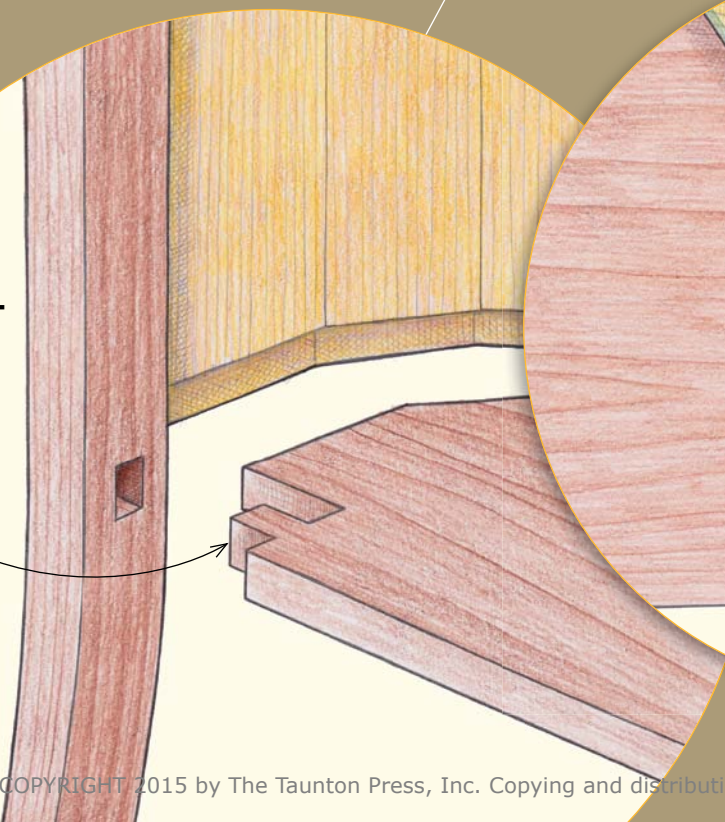
White cedar makes a lightweight core.

Veneer glued with its grain 90° to core's grain stabilizes core.



## CABINET BOTTOM WORKS AS RAIL

Bottom is tenoned to leg, locking together two front legs, like a rail.

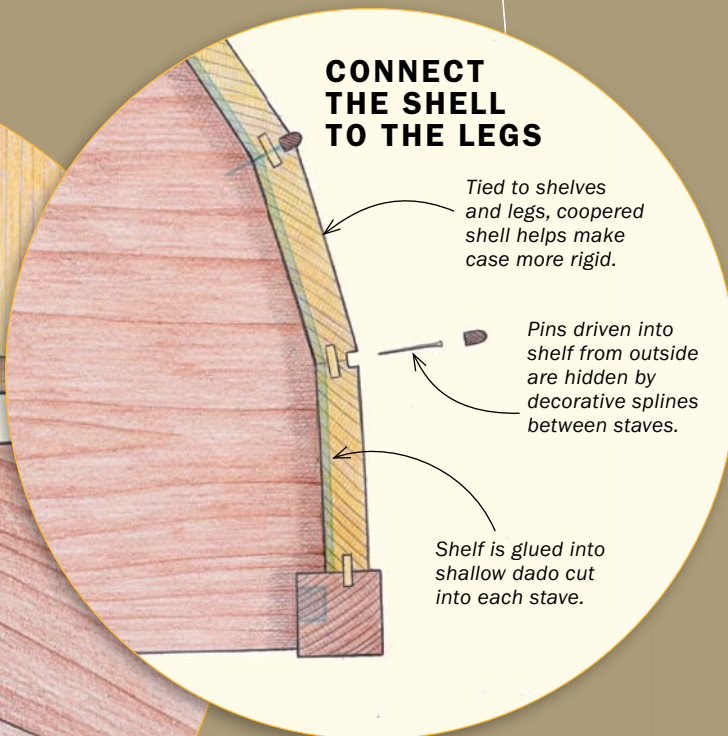


## CONNECT THE SHELL TO THE LEGS

Tied to shelves and legs, coopered shell helps make case more rigid.

Pins driven into shelf from outside are hidden by decorative splines between staves.

Shelf is glued into shallow dado cut into each stave.

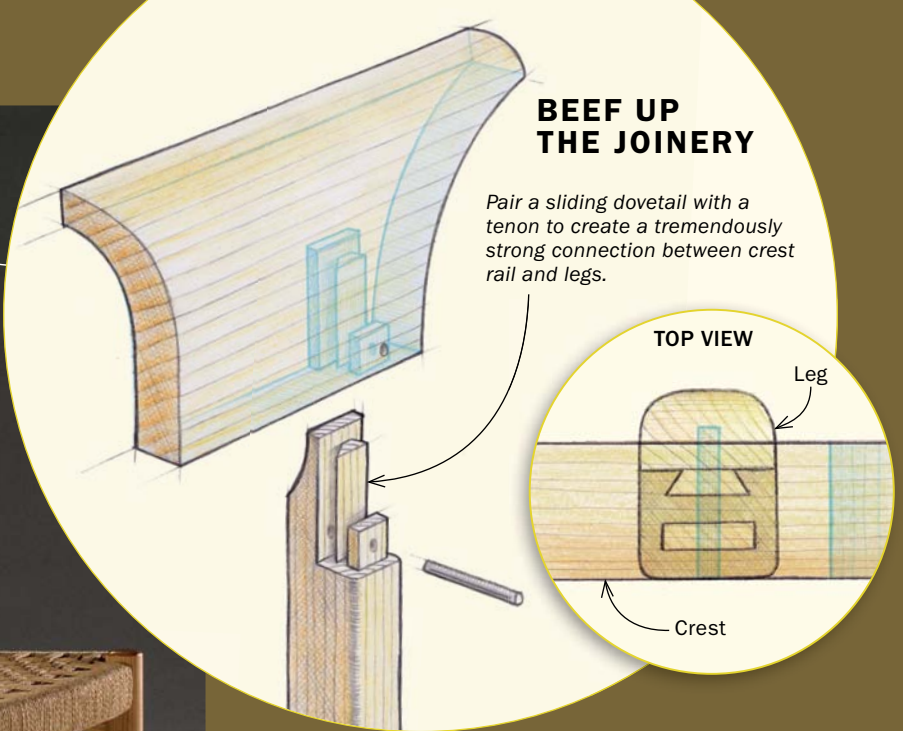




Lumbar supports, back seat rail, and crest are all light parts but work together to make a strong and stiff "backbone" for chair.

## BEEF UP THE JOINERY

Pair a sliding dovetail with a tenon to create a tremendously strong connection between crest rail and legs.

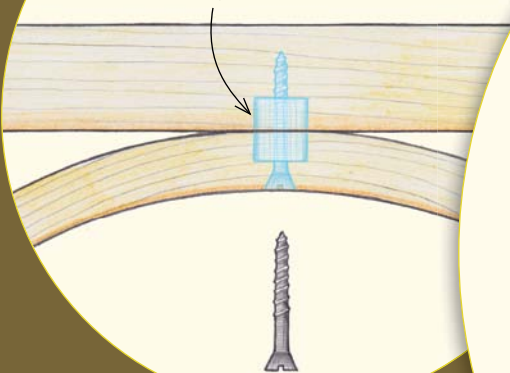


## Make lightweight parts carry a bigger load

A joint's strength doesn't come from the overall mass of the parts it holds together. Use this to your advantage by breaking up a single part into two (or more) smaller ones. Two narrower aprons are just as strong as one wide one as long as they are spread apart far enough.

## ADD REINFORCEMENT

Slip tenon, reinforced by a screw, creates single rail from two.



## TURN SMALL PARTS INTO BIG SHOULDERS

Top side rail does double duty as part of seat frame.

Bottom rail's arc increases distance between attachment points.

Two rails have the effective strength of a single rail with a shoulder equal to distance between rails.

More than a decoration, cord wrapped around joint improves its strength, and because it's wrapped around the entire seat frame, it strengthens that, too.

