

Mock-ups Quicken the Design Process



Same-sized models of chairs can solve problems before they cause a deadlock in the shop

BY KEITH ALLEN



Compared to any other furniture, chairs are more difficult to make. They're hard to design and hard to build. They need to be as lightweight as possible to make them easy to move around. Yet they also need to be strong to survive almost certain abuse. Most furniture designs begin with two-dimensional drawings, but drawings can fail to capture the complexities of a three-dimensional object such as a chair, and drawings are worthless for determining comfort.

To my mind, the chair maker's ultimate challenge is psychological. After surmounting all of the obstacles to design and construction, the custom chair maker is then called upon to produce precisely repeated multiples. I regard this boredom factor as the most difficult aspect of chair making.

For chairs, I usually dispense with drawings and begin instead with three-dimensional mock-ups. I can test-drive a good mock-up for comfort, and I can better assess how the chair is going to look. The mock-up can reveal any structural weakness early on as well as provide a convenient basis for precisely cloning multiples if I have more than one chair to make.

I make mock-ups of inexpensive, even junk, material. The parts are typically fastened together with butt joints, using a few toenailed screws per joint. I use #2 square-drive screws, 2 in. to 3 in. long, and predrill pilot holes and countersinks for the screw heads. Cutting a dry biscuit joint in the pieces being joined often makes it easier to align them during assembly.

You can easily change the dimensions and the joint geometry of

mock-up parts by trial and error, as the chair design evolves experimentally. A compound-miter saw is a useful tool for this process. I record angle setups directly on the pieces as I cut them. The resulting mock-up is strong enough to test for comfort, and the temporary joinery gives me a good feel for whether permanent joinery will be strong enough to withstand likely abuse.

Make the transitions in stages

I've learned to make mock-ups in two stages. During the first stage, I determine the size and geometry of the parts and resolve ergonomic issues: how wide to make the front of the seat, for instance. In the second stage, I concentrate on form and aesthetic details: Should the top edge of the crest rail be rounded over or left square?

The first stage usually requires a minimal rough-shaping of relatively few pieces, such as the seat and back. When that's done, I'm almost ready for the transition from design to construction. I can simply disassemble the mock-up and use the sized pieces to produce blanks for however many chairs are needed. In making the actual chairs, I replace all of the screwed-together joints in the mock-up with routed mortises and loose tenons.

In the second stage, I test aesthetic ideas directly on the mock-up by trying one design detail on the left-hand side and another detail on the right-hand side. Because making blanks for the final chairs from highly shaped pieces can be cumbersome, I usually clone the mock-up between the two stages. Design decisions made when working with the second-stage mock-up rarely require any change in the overall size of parts.

The two-stage mock-up process not only provides a natural transition between design and construction, but it also helps me organize the process better and concentrate on one problem at a time. Also, construction of the actual chair is easier because the process roughly shadows the design process: Cut blanks, rout joints, shape parts, sand, assemble and finish.

Experience has proved this method useful

I've used mock-ups to great advantage, as demonstrated with the two projects shown here. Both of these jobs called for making sets of eight upholstered dining chairs to go with dining tables that I had made for the clients. In each commission, building the mock-up took me about three days, and building a set of eight chairs from the mock-up took about two weeks, working alone.

I built the set of mahogany chairs (see the bottom right photo on the facing page) in a style derived from traditional Queen Anne elements. The client handled the upholstering chores and experimented directly with the mock-up, attaching webbing and padding to it, to decide on the appropriate cushioning. With the

finished chairs, I provided slip seats for the upholstery. The set of bird's-eye maple and cherry chairs is quite contemporary, what I call a "George Nakashima-meets-Gerrit Rietveld" sort of style (see the top right photo on the facing page). Upon viewing the mock-up, and at my suggestion, the client decided to replace two front legs with a single, central, vertical support. Modifying the mock-up was painless.

Upholstery—foam and fabric on plywood inserts—was the client's responsibility. After using the mock-up to produce chair blanks, I reassembled it and delivered it to the client, along with the plywood inserts for all of the chairs. While I worked on the chairs, and with a deadline fast approaching, the client took the mock-up and inserts to the upholsterer for a test sitting to determine just the right cushioning. The upholstered inserts were ready by the time I completed the chairs. On delivery day, using



Designing in three dimensions. For both sets of completed chairs shown on the facing page (top and bottom, right), the author cut to the chase in the design process by skipping the drawing stage.

four metal tabletop fasteners per chair, I installed all eight inserts within an hour. Having the mock-up available for the upholsterer's use probably saved the client a week or more in total project time.

An efficient chair maker is a happy chair maker

While no method can eliminate all of the tedium of some projects, the efficiency of my mock-up method has reduced the boredom factor for me to a tolerable level. I once either dreaded taking on chair commissions or simply rejected them. Now, the mock-up helps me solve design problems and communicate with clients better than drawings or full-blown prototypes ever did. This method makes me feel so efficient and organized that I'm planning to use it for a few speculative pieces of furniture. □

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