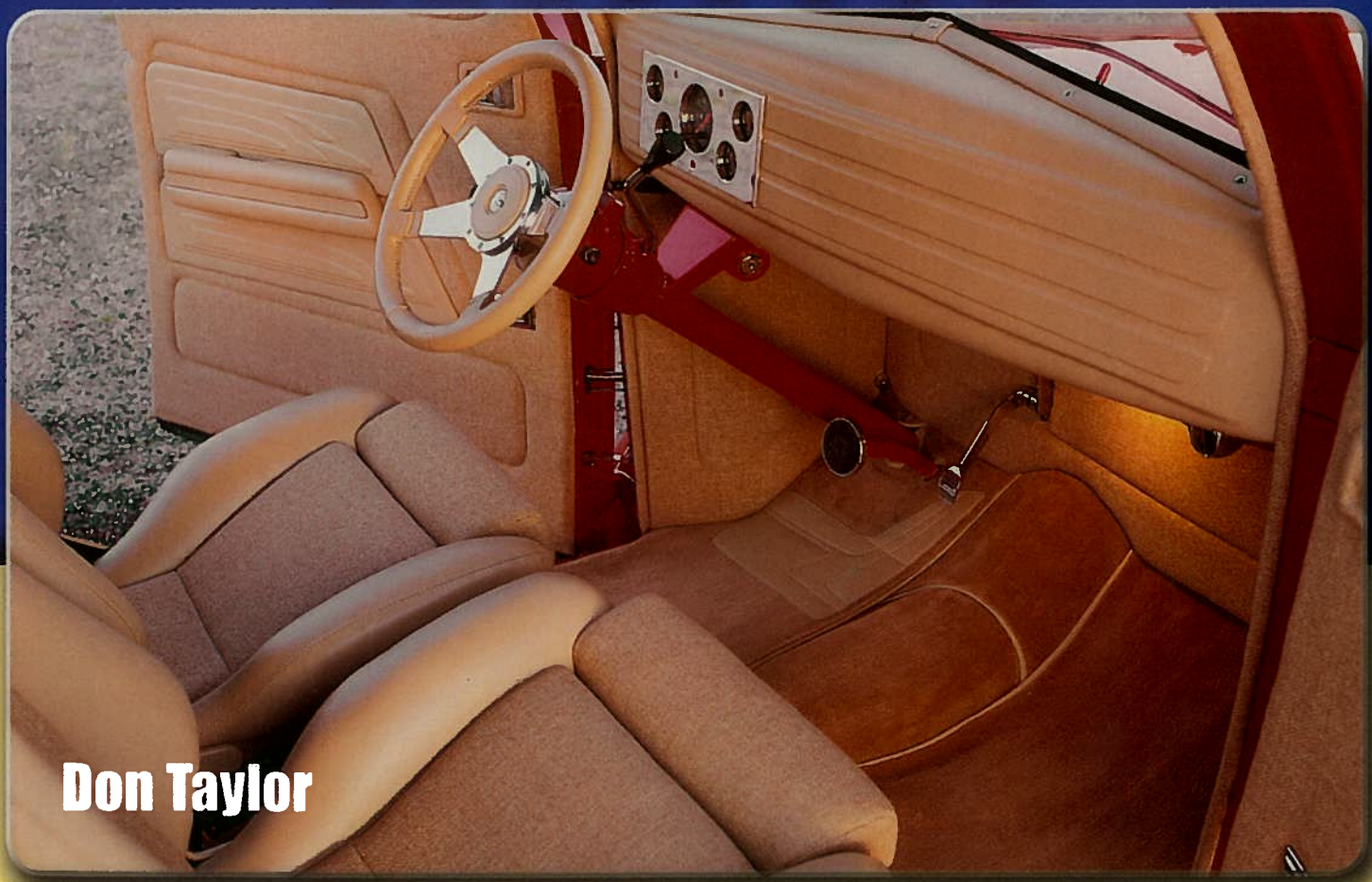
How to use trimmer's tools, fasteners and materials • How to cut, fit and sew
Make and install complete interiors • Vinyl & convertible tops • Tonneau covers

Automotive Upholstery HANDBOOK



Don Taylor

Automotive Upholstery HANDBOOK

by Don Taylor

California Bill's
Automotive Handbooks

Tucson, Arizona

Foreword

Well friends, here it is. I'm giving you a thorough overview of the auto trim trade. As a skill, it is neither a science nor and art—it is both. If you read the directions laid out here for you, and follow them, you'll be dealing with the science part. When you begin to work the materials, sew a smooth seam, and pull out wrinkles, only then will you begin to practice the art.

And practice there must be. No "art" was ever learned without practice, be it music, medicine, or auto trim. Practice on friends' used cars. Let them pay for the materials; you do the work and offer no guarantees.

When you begin to get a handle on it, then you can begin to charge them a few dollars for your labor. If you're going to get serious about the trim trade, save those few dollars toward buying a good sewing machine and some of the other tools which will speed up your work and increase quality.

If you only do it as a hobby, I know you'll have a world of fun. Each job will be a new challenge with the reward being satisfaction in doing a job well and creating a serviceable product. I hope you enjoy the work as much as I have for lo these many, many years.

Eddie Salcido of Master Craft Auto Interiors in Tucson, Arizona, created the outstandingly handsome upholstery on our cover car. The beautiful 1937 Ford two-door sedan, owned by Gare Perry of Farmington, New Mexico, was featured in the December 1991 *American Rodder* magazine.

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7 Late-model Seat

With Bucket Seats, Headrests & Center Armrests

In the previous chapters, we worked on products of the '60s and '70s. These are excellent learning projects because they're quite forthright and simple, have little or no high-tech engineering or materials, and are readily available to be worked on. Now, we're going to put all your newly acquired skills to work on a late-model interior.

For our example I've selected a 1989 BMW with bucket seats, headrests, and a center armrest in the rear bench seat. This arrangement is common in late-model automobiles.

The customer made one of the common requests heard today: remove the vinyl in the body of the covers and replace it with a fabric. Whether you're a resident of the southwest or the northeast, vinyl can become uncomfortably hot, hot, hot in the summer and cold, cold, cold in the winter.

In the vocabulary of the trade this type of work is called an "insert job." We'll be "inserting" a cloth body into the existing vinyl. Rather than replacing all the materials we'll carefully remove much of the vinyl coming in contact with the customer's body and replace it with cloth. The remainder of the seat stays. Our project seat will be finished in a gray-black, tweed-style velour.

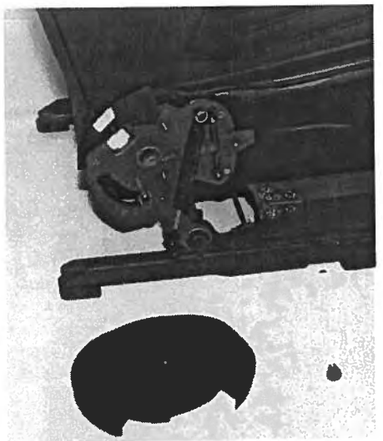
This looks more like the "after" than the "before," yet this is what the customer wants: new cloth inserts. Trim shops do this all the time.

All of the major techniques you have learned so far will be used in this job. Then, we'll add a few new ones. Contrary to what I said in the last chapters, you'll learn to use the old material as a pattern. You'll see some tricks the auto industry created to do away with listings and discover a number of short cuts that speed things along. So, let's take a look at our job and get started.

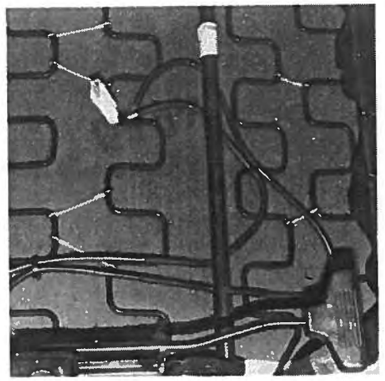
ESTIMATING YARDAGE

By now this should be a snap for you. You shouldn't need to make a drawing, just take the face measurements, block them out in your mind and come up with the required number of yards.

The cushions are a bit over 1/2 yard; the seat backs are a bit under 2/3 yard. Each is less than 27-inches wide. Therefore, you should need 1-1/2 yards to do the buckets. The rear bench seat will need another 1-1/2 yards but is right at 54-inches wide in the cushion and a bit more across the back. If you add another yard of material this will give you end caps for the rear cushion with

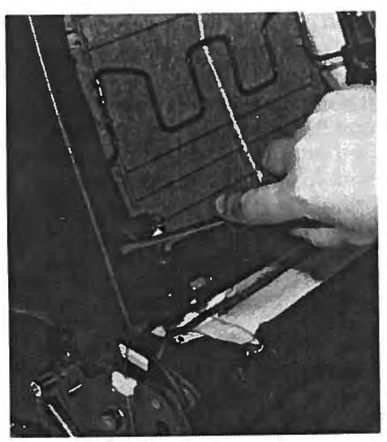


After removing the reveal molding we can see this is no simple hinge. Before disassembling be certain you can assemble it again. Make drawings, take Polaroid pictures or keep its partner together until you've asssembled this one.

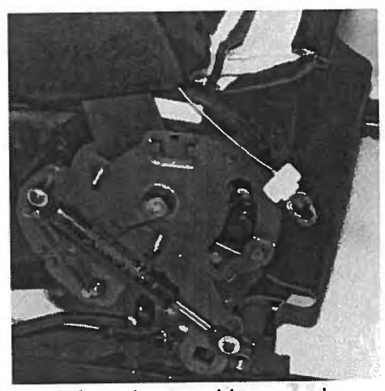


Carefully cut the wire ties holding the electrical wires to the springs. Copy the color code so you can put things back together.

Notice hinge mechanism attached to tracks. This is quite common on late-model cars, less common on some of the earlier models.



One screw on each hinge bar secures the BMW back cushion. This is only one of the many ways a seat may be assembled.



Check for release cables or rods from the back cushion to the hinge mechanism. Disconnect them before trying to remove the back cushion from the hinge bar.

enough left over for the headrests and rear center armrest. Thus, 1-1/2 + 1-1/2 + 1 = 4. Easy enough; we'll need 4 yards of fabric.

DISASSEMBLY

Seat Removal

Getting the bucket seats out of the car usually requires removing four bolts (or nuts). These are generally accessible from inside the car on models from the late '60s on. Earlier model vehicles were bolted through the floor pan and accessed from under the car. Be sure you disconnect any electrical wires *before* lifting the seat from the car. This "beemer" had two wires: one for the seat-belt-warning light and one to power the seat warmer. Yes, dear friends, an honest-to-goodness bun warmer, built right into your BMW!

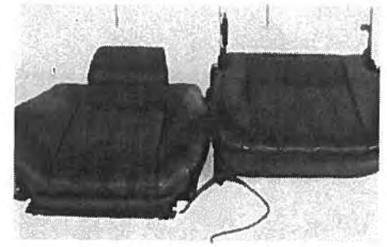
The back bench seat is usually removed in one of two ways: lift straight up on the bottom edge or push the bottom edge towards the rear of the car—then lift up. This rearward push unlatches the seat. The rear seat back is usually bolted to the body in two places along the bottom edge. The top is retained by hooks. Remove the bolts and push straight up on the seat back to slide it out of its retainers. Now let's get the bucket seat apart and the cover off.

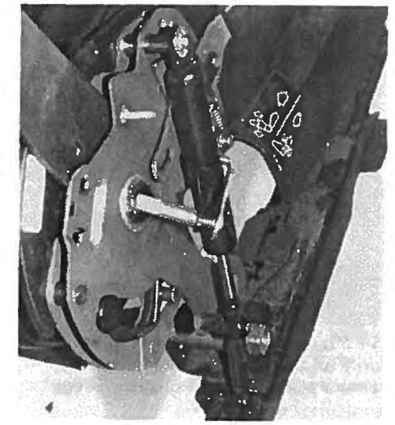
Bucket Seat Disassembly

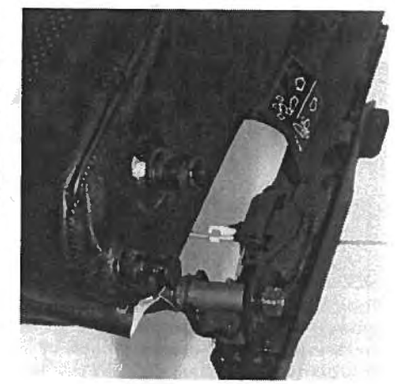
My first admonition is to disassemble one seat at a time. These high-tech, umpteen-way seats are true nightmares when it comes to reassembling them. Any child over the age of five can get anything apart. Putting it back together can frustrate an engineer! So, save an assembled seat to look at. If you're only doing one seat, take Polaroid™ pictures to remind you where things went.

This is a real hard point to get across. Most people are positively sure they can remember where a particular part went. Maybe they can for 10 minutes. I know of no one, however, with that photographic memory we're always hearing about. So unless you're that person, keep a *visible* record of the disassembly. Please!

Watch over my shoulder as I take this seat apart. You'll see I have taken my own good advice later in the chapter as I reassemble it.







Clockwise from above: 1. Back cushion is off successfully. Now we must get the hinge mechanism off the cushion and tracks. 2.To remove this particular hinge assembly, it is necessary to remove the latch trigger first. 3. Remove the snap ring retaining the hinge to its mounting. 4. The hinge is finally off. Can you close your eyes now and assemble the seat. I don't think so. You'll have to peek first. So keep a drawing or photo to peek at when it's time to do your job. 5. Seat tracks are the simplest of all the mechanisms. When you install the tracks after the job is complete, check to be sure each track is in the same position (one not accidentally shoved forward or back.) If one track is off by even 1/2-inch, you'll have a devil of a time mounting the seat in the vehicle. The holes won't line up.

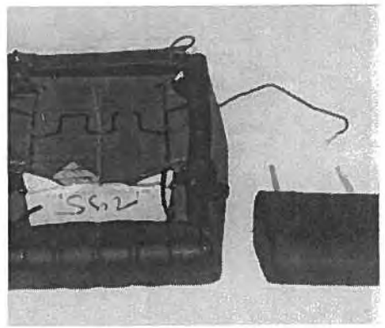
Begin by removing any reveal moldings (plastic covers) so you can access the moving parts. Disconnect or remove any electrical wires or motors. Most "power seats" are removed with the motors fixed to the seat and track. Our BMW has wires going to the seat-back warmer and to the seat-belt buckle which came out with the seat. In turn they were tied to the springs with wire ties.

On late-model cars the hinging mechanism connecting the back to the cushion usually incorporates a number of features. These may include letting the seat assembly slide forward when the back is released to allow passenger access to the rear seat. Or, let the seat back down into a reclining position. This is often accomplished with a lever on the side of the seat back. Cables or wires go from this lever to the hinging mechanism. These transfer lines must be removed. When all the attachments between back cushion and seat cushion have been removed, the back cushion may be unbolted from the hinging mechanism. Our project back cushion is retained by two bolts through the back-cushion frame and into the hinge arm.

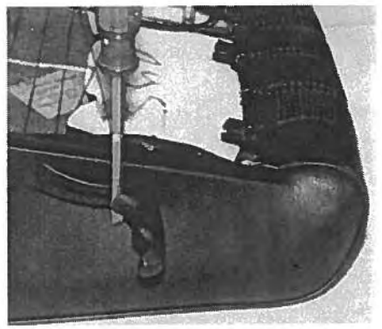
To remove the hinge mechanism from the seat cushion I removed the bolt that attached it to the seat track, removed the trigger (by pulling it out) which lets the back recline, then removed the snap ring retaining the hinge mechanism to its shaft. Voila! It's off. The tracks can then be removed from the seat.

You may have to deal with power-seat motors. Usually these are fairly straightforward. If electrical wires must be removed, *tag them so you'll know where they go.* Do this even if you only disassemble one seat at a time. Sometimes only the driver's seat will have electrical wiring—the passenger's seat doesn't. So attach little masking-tape flags to the wires indicating where they go. You still have the back cushion to take apart.

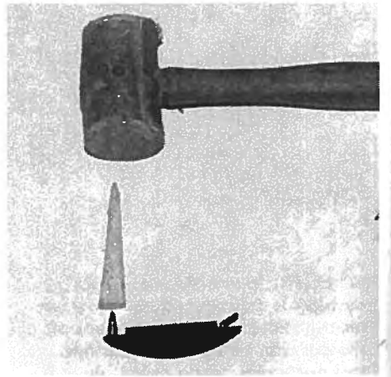
Begin with the headrest. The project seat was easy; I just yanked it out. Not very sophisticated for BMW. See the sidebar on page 93 for a more common way to remove a headrest. A tentative rule of thumb is this: if the seat outside back is removable, the headrest locking device will be accessible by removing the outside back;



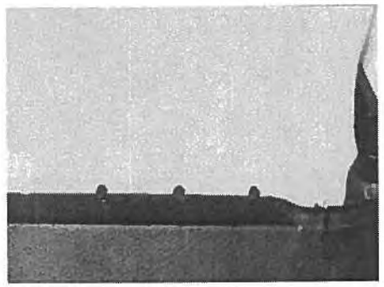
Headrest comes out with a simple tug.



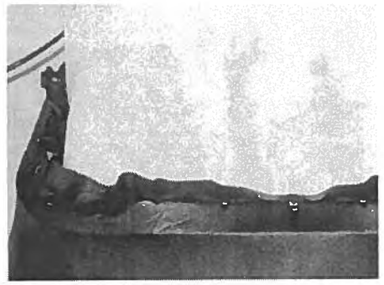
Seat lever is retained by compression only and can be removed with the gentle persuasion of a screwdriver.



Molding won't stand up to any screwdriver work. Use a dowel and hammer to work the expansion pin out. What appears in the photo to be a broken expansion pin is really a hook. One end is hooked, the other pinned.



Tabs have replaced hog-rings. This type of assembly suggests these covers might have been installed by "robots" at the factory.



Lift tabs and remove cover. Lift tabs only as far as needed to reduce work fatigue in the metal. This will help prevent them from breaking off.

otherwise, refer to the sidebar method. There is an exception: Mercedes Benz has a removable back with a hidden button, usually visible as a small indent up by the headrest area. Push this button (through the leather) and pull out the headrest. Is this sufficiently confusing? You bet! If all else fails, call the dealership and the parts or service manager should be able to help you.

The two levers on the sides of the project seat were pried off with a screwdriver. Before trying this on your seat, check first to see if there's a setscrew. Many manufacturers lock these levers in place with setscrews. To remove the reveal molding, check first for screws. Then remove the plastic expansion pin. Don't try to pry this off. The risk of breaking something is too great. Instead, with a hammer and a wooden dowel, knock it out from the backside. At worst you'll only break the expansion pin. If this happens and you can't replace it from the dealership, a dab of hot glue will hold it on quite satisfactorily.

A picture begins to develop here. In late-model cars, as much as possible is "snapped together." This labor-saving plan is employed by the manufacturer to hold down costs. In the next section you'll see the manufacturer has even removed most of the need for hog- rings.

Seat-cover removal (Cushion)

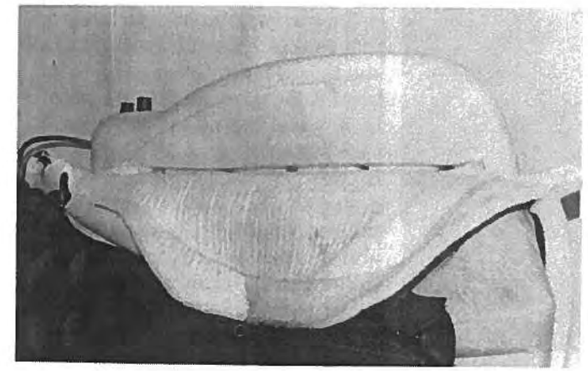
The illustration on the next page shows how the seat cover is retained to the frame. Holes are prepunched into the vinyl. These holes are then slipped over metal tabs welded to the seat frame. The tabs are bent down to secure the cover. I wonder how we're going to attach a seat cover to this frame in years to come when all the tabs have snapped off.

Disengage the cover around the bottom of the seat frame and lift it up. Well, here's a familiar sight: the pleats are retained with old-fashioned listings, wire and hog-rings. Cut out the hog-rings and take the cover off the seat.

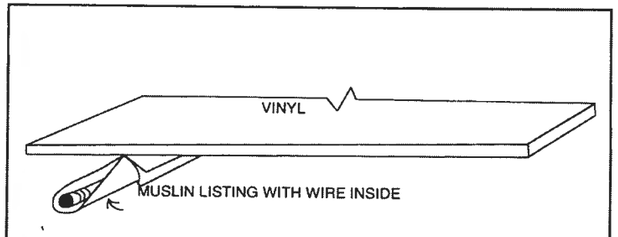
Look at the photo on the opposite page showing the underside of the cushion cover. Note three things: first the "foam" (polyester felt instead of polyurethane foam) is larger than the cover. This acts as padding for the sides of the seat. Next, what appears to be stitching for the pleats is actually heat-sealed seams. Those three gray things in the center? They're plastic listings to ring to the seat. Quite a bit different than what we've seen before, yet serviceable and very efficient.

The only problem for us is to duplicate those three plastic tabs that serve as listings. Because they're heat-sealed they can't be removed to use again.

I've carefully removed the heating coils as seen in the next photograph. They're similar to the heating coils found in electric blankets. If your seat has these,



At least there's still a little of the old technology here: a listing retained with hog-rings.



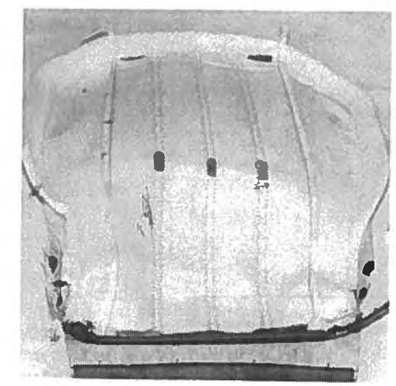
Listing is a 1-1/2 -inch wide strip of muslin folded in half and sewn to piece of vinyl or fabric. Rod or wire can be inserted through loop. If you use a fastener such as a hog-ring to loop over wire, material can be fastened to frame so fasteners can't be seen.

handle them with care as they're very delicate. When the heating coils have been removed, you've one more thing to do before you're ready to take the cover apart. You must make a number of locator marks.

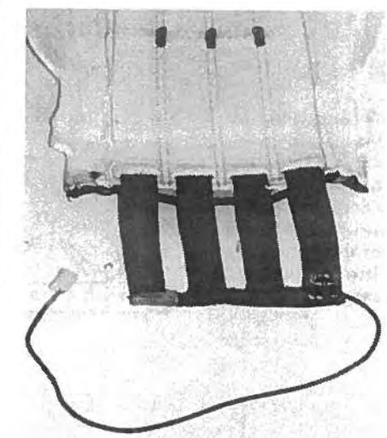
Using your scissors, cut small notches in the selvage edge about every 4 inches along all the joining seams in your cushion cover. I start in the center and work both ways, being sure to put one where I'll start sewing and one in each corner. These marks are very important to get everything back together the way it was. *Don't bypass this step!* Now you can cut it apart.

I use a razor blade or sharp knife to cut the threads holding the cover together. I find it goes faster than using the scissors. On this insert job I'll be inserting the pleats and end caps so I didn't separate them. As we progress you'll see why.

When you cut the facing from the body, leave the welt attached to the facing. When you sew things back together, sew the facing and welt to the body at one time. This saves the time it would otherwise take to sew the welt first, then the facing. Now let's make the insert.

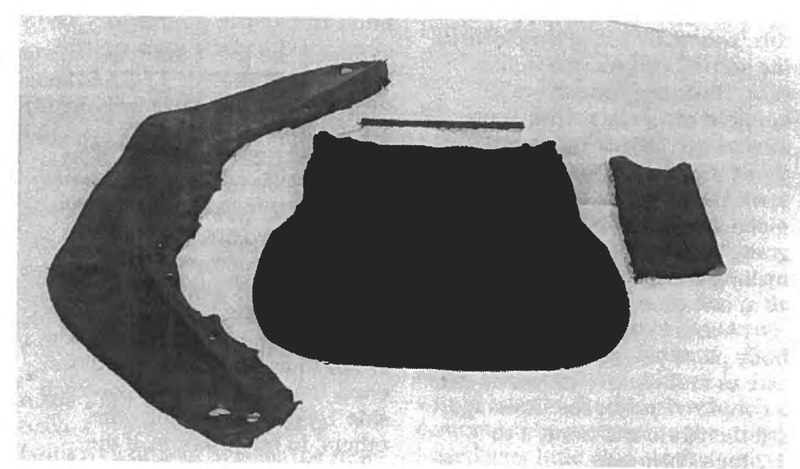


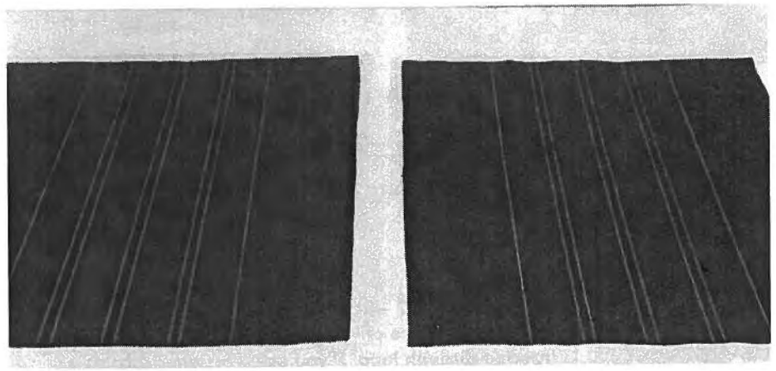
Three gray tabs take the place of a listing to hold down the cover in the center.



I've pulled the heater coils out a little to give you a look at them. They're very fragile. *Handle with care!*

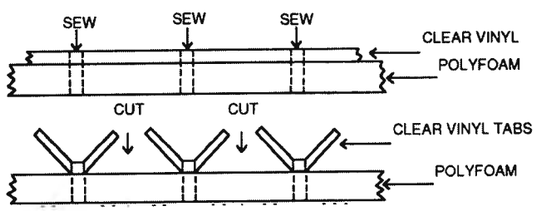
Below: Component parts of the seat cushion. Body, seen in the center, will be inserted with fabric.





Layout of the pleats for both seat cushions. Notice two seams define the pleats. Though you can't tell from the photo, two outside pleats are 1/4-inch larger than their inside buddies. This will accommodate the seam allowance for blind-stitching the end cap.

These cross-section line drawings show how a piece of clear vinyl is cemented and sewn to the back of the Polyfoam. The resulting tabs serve as listings.



SEAT REUPHOLSTERY

Fabricating the Insert Piece

Essentially you've already done this. You made top-sewn pleats in the second project, the bench seat. This time, though we're going to throw in a twist. If you looked carefully at the face piece in the photos you saw four top-sewn pleats with a separate end piece on each side. Well, we're going to make life a little easier by making the pleats and end pieces all at one time. Here's how.

Measure across the top of the body piece you're going to fabricate to find the overall width. Add a couple of inches for shrinkage, cut the fabric and bond it to 1/2-inch Polyfoam.

As in Chapter 4, when you made your first pleats you added a little for shrinkage. Again, you must add a little on this job. The curve of the pleat uses up the material, making the finished product narrower than what you started with.

Be sure you have the nap going in the correct direction: top-to-bottom for the back cushion, back-to-front for the seat cushion. You can see I'm doing the seat cushion and back cushion at the same time.

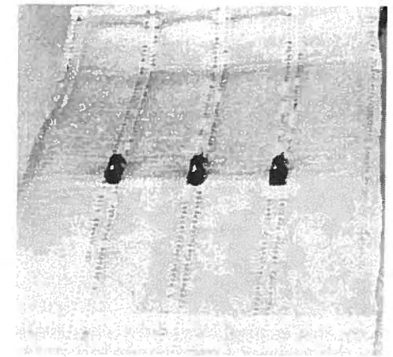
Now, layout the pleats as you did in Chapter 4, with one difference: make the last pleat on each side 1/4-inch *larger* than the others. In other words, if the other pleats were 3-inches wide, make the two outside pleats 3-1/4-inches wide. The finished product should have several pleats in the center, the two outside 1/4-inch larger, and then two large "end caps" (they're not really caps because it's all one piece of material). Before I can sew the pleats I've got to do something about those three plastic listings in the center of the seat. Refer to the drawing at left to see how I solved this problem.

Working from the backside of both the old and new pieces, I draw a line across the pleats at the exact location of the listings. Then, I cut a piece of clear vinyl from a scrap of convertible rear-window vinyl about 1-1/2-inches wide and long enough to cross all the pleats with another 1-inch on each side. I cement this piece, centered over the previously drawn location line, to the back of the Polyfoam. This will hold it in place while I top sew the pleats; and simultaneously, the clear vinyl in place. When finished, I'll turn the work over, separate the vinyl cemented to the Polyfoam, and clip the vinyl down the center of each pleat. This will give me three wing-shaped tabs, which, when trimmed, will become my three listings!

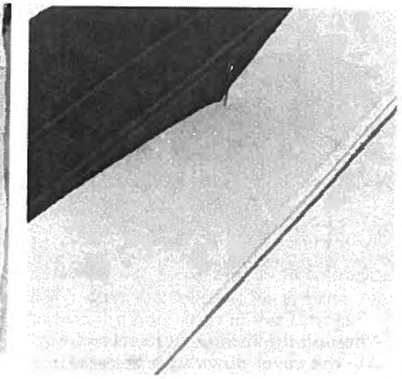
All of the top-sewn seams are in place. We must now make the end caps appear to be blind-stitched to the pleats.

At the sewing machine, fold the material face-to-face along the outboard top-sewn-pleat seam (the one you made 1/4-inch wider than the others). From the back side of the material sew another seam *1/4 inch in from the fold line.* Now you have a blind-stitched end cap. Turn the material over and see what you have. You've got top-sewn pleats and what appears to be separate end caps.

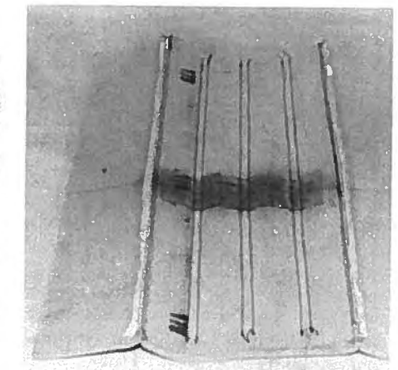
This is a quicky way to do the job when the material for the pleats and end caps are the same. On our bench seat, the pleats and end caps were different



These are the original vinyl tabs.



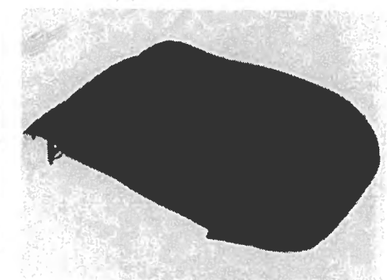
After blind-stitching the end cap from the backside of the Polyfoam, sew the listing material directly over the top of it.



Back of insert showing clear-vinyl tabs, top sewn pleats and blind-stitched end caps with listings.

Align old seat-cushion body *carefully* over newly fabricated insert (body). Weight it down or tack it to the bench.

I've finished sewing and am now pushing the heater coils back into the pleats. If your project has these, install them carefully. Make sure they don't twist on the way in.



Here's the finished cover ready to go back on.

colored materials so they could not be sewn this way.

Turn the material to the backside again and sew in the listing. Now you're ready to fit the old body piece to the new.

Fitting the Insert

Here comes the exception to the rule. Earlier, I stated you should never use the old material for a pattern. If the old material had stretched out of shape, then the new piece would be out of shape also. Well, my reasoning is still correct, but here we have a relatively new car, only 1-year old. There's little chance of copying any distortion from the material.

Lay the old cover face on top of the newly sewn insert, aligning the seams, and in the case of our project seat, aligning the center listings. Place weights on top of the pieces to hold them in place or tack them in place to the bench or to a piece of plywood as we did before. Carefully chalk a line around the outside of the selvage edge making a mark for each notch cut as a locator mark. *Don't forget the location marks!*

Now, to the sewing machine. You've done the next steps before but here's a quick review.

Sewing Seat Cushion Back Together

Sew a locking stitch around the chalk line and trim away the excess material right up to the seam. Starting at the locator mark you made to indicate where to begin the seam, lay the facing (with welt attached) onto the new insert. Begin sewing through the facing and welt, maintaining an accurate 1/2-inch seam allowance and matching notches (location marks). Don't forget to lock your stitch at the beginning and end of the seam. Finish by sewing the stretcher onto the rear. Zippo-whippo, you're done!

Reassembly to Frame

Now you've got to get this work of art back onto the seat frame. On the project seat I need to put the heater coils in first. To do this I made a slit through the Polyfoam at each end of the four pleats. Then I ran a yardstick in between the material and Polyfoam to break the glue bond. I knew I would have to do this; so when I cemented the material to the poly, I used very little glue. At the end of each heater coil there is a little

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Automotive

Automotive Upholstery HANDBOOK

Learn step-by-step how to:

- Make and install interiors for any car, truck, van, RV, boat or airplane
- Sew like an expert—on vinyl, leather or any fabric
- Restore, recover and build bench and bucket seats
- Upholster armrests and door panels
- Make and install headliners and carpeting
- Install convertible tops, vinyl roofs, sim-con and landau tops
- Create street rod interiors
- Build boat and motorcycle seats

Author Don Taylor has spent a lifetime as a professional upholsterer. He has owned and operated upholstery and van-conversion shops. Don shares his vast knowledge and many years of experience so you can do the job right and get the results you want!

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AUTOMOTIVE UPHOLSTERY HANDBOOK

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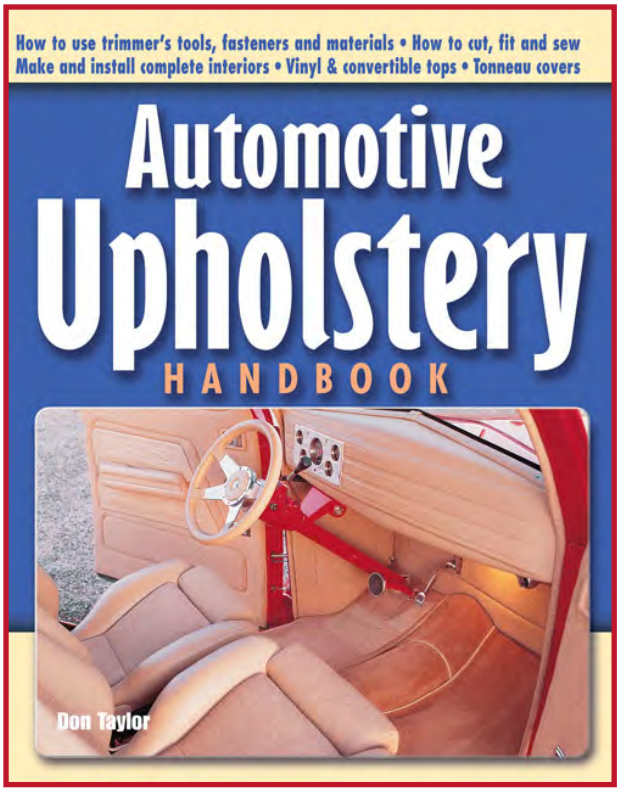
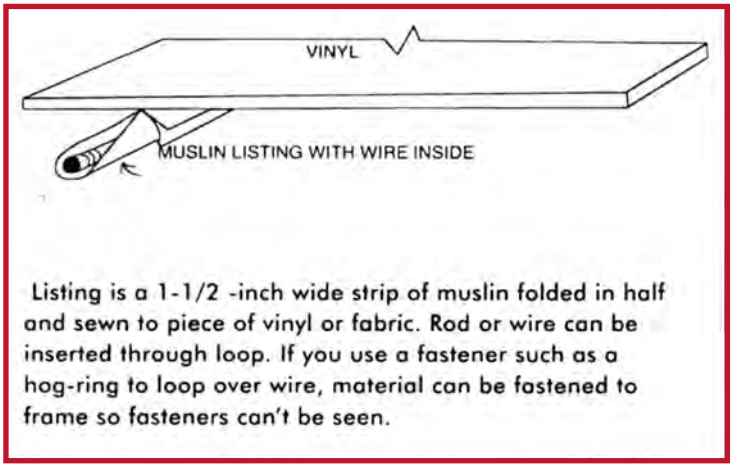
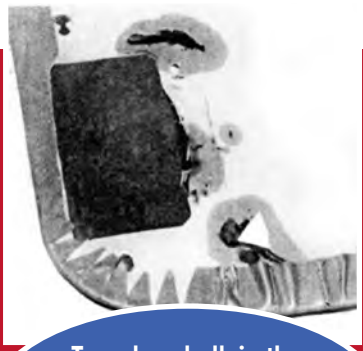




Listing is a 1-1/2 -inch wide strip of muslin folded in half and sewn to piece of vinyl or fabric. Rod or wire can be inserted through loop. If you use a fastener such as a hog-ring to loop over wire, material can be fastened to frame so fasteners can't be seen.

Finished seat: now has nice, breathable fabric.

If radius is large enough, you'll not need to clip boxing as you did welt. If it looks as though material is stretching–indicated by selvage edge curling up from strain–clip it to release strain.



To reduce bulk in the corners, cut tight "Vs" around the radius before cementing corners in place.

Remember when you're using such a pattern, that chalk line is the seam line, not the cutting line. Maintain the 1/2-inch seam allowance.

Completed project, well worth the effort.

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Carpeting gives much more protection than a vinyl heel pad.

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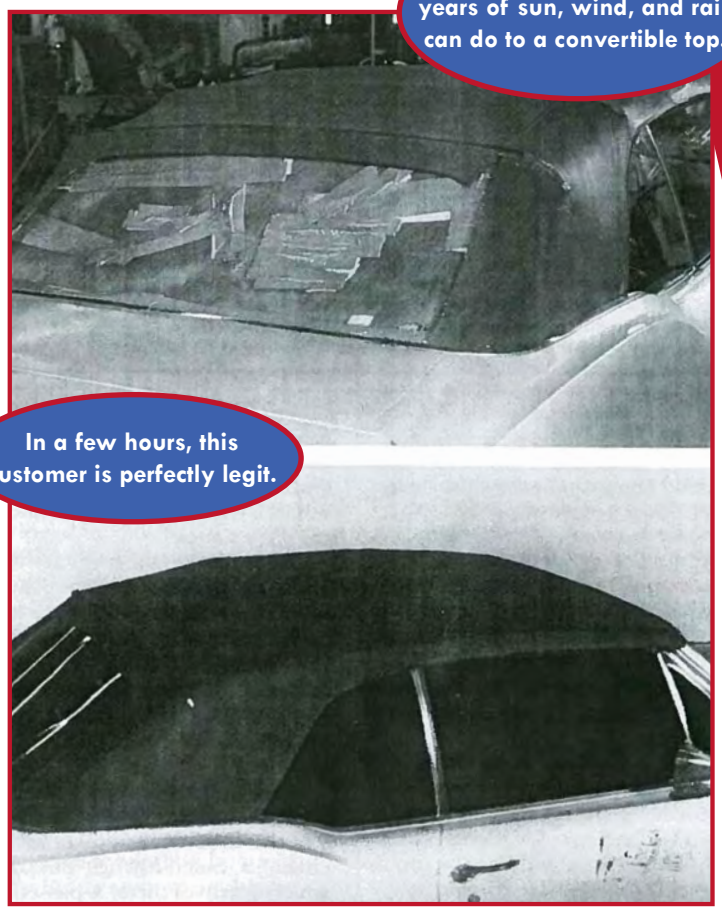

Here's what a few years of sun, wind, and rain can do to a convertible top.

In a few hours, this customer is perfectly legit.

Don Taylor grew up in the auto trimming business: his father was a trimmer, Don is a trimmer, and his two sons were trained as trimmers as they grew up. As an expert author, Don created the *Automotive Upholstery Handbook* for California Bill's and six automotive books on engine rebuilding, restoration and paint and body work for HPBooks.

In 1979, with his brother Alan, Don created numerous van conversions. They also created several exciting vehicles, including Toyota's "Yamahauler", and the "Huskyhauler." One interesting job was trimming a steam-powered taxicab with seating for the physically handicapped. The vehicle was displayed for a year at the Smithsonian Museum with a Taylor-Made sign.

Just prior to a 14-year "retirement," Don's work on the interior of a 1932 Auburn Coupe won Best of Class, People's Choice, and Best of Show awards at the international Auburn/Cord/Duesenberg Show.