

# COVERING

## A STEP BY STEP

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Covering a model well doesn't have to be reserved for master builders only. Use the following methods as a short cut. Along the way you will probably come up with your own techniques to resolve a particular challenge. Pretty much anyone who has the desire and patience can learn to cover a model well. Just take your time and be sensitive to the materials and their needs to extract the desired results. To begin it is important to understand the underlying surface to be covered plays an important roll in the final success of the job. So lets cover that subject first.

### The Surface

#### Wood

The surface like in painting should be smooth and finely shaped. Just like paint, the final result is only as good as the surface below it. But not too smooth though - an extremely smooth surface can cause air bubble to become trapped. Take your time and get it right. Make sure to leave space in areas that come together for the covering so areas such as ailerons have free movement.

#### Metal

This can be covered quite well, especially if the metal has open bays (like on some landing gear) and somewhere for the air to escape. Keep in mind that metal will act like a heat sink so... You may need to use a higher temperature to get the same effect (sealing, shrinking, or tacking).

#### Fiberglass

This can also be covered. Items like Wheel Pants and cowls are some of the most likely items for covering. If there are lots of curves take your time. Cut smaller pieces of covering - maybe small enough that they begin to take on the look of panels, as on the full scale. Remember, if they bend metal in those shapes you can replicate them using covering. Leave some overlap to account for the shrinkage of the covering. Later as dirt and grit get pushed into these seams they will only look more realistic.

#### Foam and plastics

It is possible to cover these materials well too. Just remember that heat can warp and distort them. Foam, especially the dense blue construction foam, can take an amazing amount of heat for very short periods of time. Hold the heat just on the surface to be covered. Don't let it penetrate deeper into the foam as this will start the caving-in process. The cooler type foam is far more sensitive to heat because it is less dense. Use only medium heat as a maximum and use a low temperature covering like Ultracoat or even lower still Econo Coat. Covering can also be used for the trim lines in windshields - just watch your heat!

#### Covering material

There is a wide variety of covering out there. The most common of these are mylar based coverings like Monokote, Ultra coat and Econo Coat. The argument as to which is better goes on. One thing is for sure though, Monocot has far better color selection and more opaque material. Most people also seem to think it sticks better. I like to use it in areas that aren't structural as it also seems to become brittle over time, especially in cold weather. Ultracoat or Oracover is the most commonly used covering in the area by far. Even with its limited colors and see-through transparency,

it is easier to deal with as it seems to have no end to how much you can shrink it. Because of that it is great for complex and tight curves. Ultracoat also seems to "outgas" very little as it is heated so it is great for covering large areas that all ready have a base layer of covering on them. Removal also seems to be easier with Ultra coat - just use a heat gun and pull it off. Direct the heat at the point where the covering is attached to the surface and from the direction opposite in which you are pulling... watch your fingers though! Ultra Coat Covering is also really tough, Two layers of the stuff and you will really struggle to punch you finger through it! The last type is iron-on cloth and is made by 21st Century. It comes in limited colors but is easily painted to suite any needs you might have. It seems less opaque than the others above and is far more flexible. This flexibility could be a good or bad thing depending on your application. The strong point of this material is its realistic look of an old time fabric covering used from Cubs to WWI fighters. A WWI model covered with this is that much closer to the full sized aircraft. Oh, by the way, you can shrink this stuff to an incredible level - even more so than Ultracoat!

#### Tools

Full sized and mini covering Iron socks

Heat gun

covering of your choice

SHARP hobby knife blades

Tape

fine point black permanent marker and disposable draftsman's ink pens

pencil

Acetone

flexible Steel ruler

flexible clear plastic ruler

30-60-90 triangle

Ships curves and misc. ellipse and circle templates

artist's cutting mat or similar surface (linoleum?)

squeegee- bondo or body filler type

spray bottle (fine mist)

A few drops of dish detergent or glycerine

paper towels

Brass tubing of different diameters

epoxy

clay or other molding agent like rtv silicone

#### The Environment

Covering is one of the final steps to your model. If you stick or scratch build the plane you may be getting tired of the project by the time you get to this stage, so beware! Nothing can make your aircraft look worse that a bad covering job, no matter how nice the under structure is. Take a day or two away from the project (I usually clean my shop). In that time think about the pattern or color scheme and begin to formulate a plan of attack. You need to be comfortable when you return to your work. If you are antsy or there is poor lighting etc. it will only cause more problems to deal with as you are trying to cover, ruining your train of thought. Trust me, even the best builders who rush this process end up with mediocre results. If you are patient and are willing to study closely what is actually happening to the covering as you heat it (e.g.- at what point does the adhesive become active, when does the film begin to shrink, etc.), you will soon learn exactly what is needed where and at what temperature settings. In order to have this level of concentration you really need to be at your best. Get as many factors in your favor as you can. Above all pay attention to the task at hand!

## The Process

With most models it is customary in all manuals to have the modeler cover the tail feathers first. This is really one of the easiest places to start due to the small, often flat surfaces. It will also allow you to get used to the tools and materials without the added complexity of curves or the large pieces of covering that can be difficult to position. Begin by rolling out your base color covering on the cutting board (covering side down) and place the part to be covered down on the coverings backing paper. Trace out the shape and cut it out. Cut it larger than the part so you can use it to pull on the edges as you seal the edges of the part. This will also account for curves that may take up more covering. Remove the part and use the hobby knife to remove the backing paper or film from the covering by parting with the blade and lifting the paper off between you thumb and the tip of the blade held sideways in your hand. Place the covering on the part and rub it slightly to build a little static to hold the covering flat on the part. With the standard sized iron equipped with a hot sock (covering iron sock) and set to about 1/3 from lowest setting begin by tacking a corner of the covering. Then move to the opposite side of the tacked area and pull and tack this side. Don't worry about trying to roll the edges at this point! Just go from side to side pulling and tacking. By pulling and then tacking you are pre-stretching the covering so later when you go back for your final shrink it will be much easier. Once all the sides are tacked it's time to roll the edges. Do this by first cutting relief slits at all the right angles of the edge of you part. Now with higher heat (about center on your dial or slider switch on the iron) pull the covering down over the edge you are covering and touch the broad part of the iron on the edge on the side that you tacked down. With a smooth rolling motion, use pressure to move the iron towards the edge of the covering keeping the iron flat on the work. Work slowly and pay attention to the film as the iron is heating and rolling it round the edge. Do you need to pull harder? Is the iron hot enough? Is the iron flat on the work area? Proceed all the way around the edge sealing it down like this. Note that by pulling on the overhang harder, using full heat and rolling slowly with the iron even curved edges can be covered without any wrinkles. Seal the covering down well beyond the center line of the part to account for shrinkage and to eventually give you two layers of covering all around the edges for increased toughness. Now go back with very high heat and really seal the edges. For this I usually take the hot sock off and just flat out bake the edges. Trim the excess overhang with a very sharp hobby knife and then do the other side. Did you notice at no time did I tell you to shrink the center area? That's because if you do and the part is thin or delicate you will warp it! Don't be tempted! Finish the other side of the part then shrink them together. You can shrink the center areas now with high heat but put the sock on to reduce the chance of scratches. You could also hover the bare iron over the area to be shrunk without touching or sliding the iron on the surface. This is a great place to use the heat gun if the part is large enough. However, it is important to keep the heat away from the edges of the part! I can't stress how important this point is! If you heat both the center area and the edge at the same time the shrinking covering will pull away from the edge and shrink towards the center. If that happens you will end up with a wrinkle that you can not remove as the covering has been shrunk to its maximum. The only cure for this is to heat and remove the covering and start over. In the past I have successfully used a metal ruler or strips of cardboard to shield the edges from heat when using a heat gun. Also, blowing the heat away from the edge towards the center of the part works well in conjunction with the shield. Keep in mind Monokote will not shrink as much as ultracoat and is less tolerant of very high heat. The

same seems to be true of metallic or chrome covering materials from both companies. In addition the chrome will begin to frost over and become somewhat prismatic if overheated (around 375 degrees with a naked iron). Sometimes you can use this to create an effect of weathering. I used this on the chrome covered exhaust plates on my Mustang and it looked great. For very finely sanded balsa sheeted areas it is sometimes necessary to give the trapped air a place to go. This is the place to use a device called a woodpecker. It is basically a roller with very sharp points. By rolling this over a surface small holes are punched into the surface that will give the gasses and trapped air somewhere to go. Some builders will actually use this after they have put on the base color covering to allow the air and other gasses to escape from between the two layers of covering. I rarely use it. I like to use two other techniques instead. The first I have all ready touched on. It's the building up of static electricity by rubbing the covering on the surface it is to be bonded to. This creates a condition that evacuates the air from under the covering in an even fashion yet still allows me to make fine adjustments to the covering to even it out. Then, with low heat I begin to activate the adhesive on the covering. Working from center out I gently squeegee the remaining air out using the standard sized iron. Then, I start the process over again but with medium heat to bond the covering better. The second is similar but instead of static I use water spayed on the surface with a drop or two of dishwashing soap to cut the surface tension. Glycerine may work too but I haven't tried it yet. Spray a fine mist on the surface and lay your next layer of covering on the surface. Using a squeg, soft cardboard, or paper towels squeegee from the center out to remove the moisture. Then use the iron or a heat gun to activate the adhesive and bond the covering to the lower surface. If air bubbles arise keep heating until they expand and join to form larger areas of hot gasses trying to escape. Most will find there way out naturally but try to direct them with the iron, squeegee etc. If all else fails poke a fine hole or two in the center of the air bubble with a sharp hobby knife or fine pin and reheat it, by then it will be minimized or disappear completely. On some areas, cover the small end pieces first then the bottom and finally the top. Seal all the edges well so when you wipe the aircraft down at the end of the day you won't snag the edges.

#### Holding the blade:

This is tough to describe in text. Most of the time you will hold the blade like a pencil, but for trimming sharp 90 degree edges you are better off choking up on your grip and hold the back part of your blade (not the handle) between your thumb and index finger. Run the blade and your fingers along the edge using it as a guide to make one smooth cut. You need to practice this and use a very sharp blade. As you pull along the surface start to think about the gentle angles you have there and how the way you hold the blade is cutting the covering. There is actually a lot to think about there! Any adjustment in angle on any axis will affect the cut to certain degrees. Concentrate. Also, try to look just ahead of where the blade is as this will help set you up for what is ahead.

#### Irons:

Know your fire... They say the mark of a good cook is his ability to judge temperature. Our covering irons are no different. All irons and heat guns use a spring thermostat to regulate temperature. The problem is that through its constant heating and cooling (and knocking around in a drawer), this spring gradually changes how it reacts to temperature. So, the perfect

setting on the dial to just activate the adhesive on the covering may be dramatically different as time goes by. Even from the same brand, two new irons at the same setting may be completely different temperatures! Also keep in mind that if you work fast and cover large areas quickly you will need to use higher heat. This is because the large volume of cool surface the iron is rapidly encountering is draining the heat from the iron faster than it can be replaced. Also, using a hot sock or not and how thick the sock is will affect your settings for a desired task. Small sized irons are great for getting into areas that are difficult for the standard size to fit into but due to their smaller size they do dissipate heat a bit too quickly... take your time when using them.

#### Dealing with compound curves

If you have ever tried to cover a warbird you know compound curves can be difficult to deal with - and warbirds have lots of curves! Usually it seems best to use smaller pieces of covering to cover them individually. Start by tacking down one side then really pull lengthwise to pre-stretch the covering. Then work from the center out to work out trapped air. Again, use the full scale as a guide. Panels weren't made just to access the innards of the bird but were also used to make bending and forming the sheet metal easier. Use this to your advantage. Just remember to leave overlap in the covering and work from bottom to top and from back to front.

#### A few miscellaneous tips

Use two full sized irons: One on high for sealing, wrinkle removal, and center shrinking, the other set to around 1/3 to half for tacking and positioning. This avoids having to wait for the irons to heat or cool for the next piece of covering.

Clean your irons from time to time with acetone to remove adhesive buildup.

Keep a fresh hot sock. If it begins to deteriorate replace it as the fibers may become attached to the adhesive layer of the covering and create bumps.

A clean work area and a vacuumed cleaned surface leads to bump free covering.

Use masking tape to separate the covering from the wood below for an extra smooth covering job (some models need the added strength of well stuck covering to the wood - especially if you plan to fly the model hard). Do this by firmly sticking the tape on the covering over the area you want to pull up and then in a quick motion pull the tape off. The covering will release from the wood below if high heat was not used to "fry" it on.

To hide see-through conditions on models with heavy wood grain or repair, spray the wood lightly with white primer and then cover for a flawless look.

Try to put dark colors over light ones only for maximum vibrancy.

Use the back end or square end of a hobby knife blade to score panel lines into covering. Be gentle to avoid cutting through.

Tape off panels and gently steel wool them in alternate directions to heighten the individual panel effect. Do this on chrome covering for a stunning bare aluminum look.

Use good ventilation when using monokote.... it stinks, and I bet the fumes are not exactly healthy either.

Photocopy call letters to the proper size, make a flipped version and spray mount the sheet to the backing paper of the film. Cut along the lines for iron-on lettering and graphics.

Use Acetone to remove adhesive or permanent marker that may have ended up on the plane.

Believe it or not you can hide scratches by using car or glass polish on the covering.... also it seems to improve the color if the color is looking a bit faded.

Use striping tape or a flexible ruler as a guide to mark out panel lines with a permanent fineline marker or drafting pen.

Use a draftsman's circle template or flexible curves to help in cutting out your design and to help with panel line drawing.

Important! Remember to unplug your irons after a covering session!

#### Added realism

If you covered your warbird with individual Panels of covering you can now use a brass tube of the proper diameter to simulate rivets and Dzus fasteners. Just pre-mark the spread and pattern with the permanent marker. Push and twist onto the covering to scuff and emboss the surface. Use a small flat bladed screw driver to make the rivets look like Dzus fasteners. Then, when you are finished wash down the model with the acetone to remove the marker. For three dimensional rivets and screw heads you can push them into a flattened bit of clay or RTV silicone to make depression molds. After that, mix up some epoxy and trowel it over the surface of the mold. Once it has cured pop them out and paint and glue to your model. The heads will look so good that you won't be able to tell which screws are real and which ones aren't!

Above all, take your time... this isn't a race. It's a hobby you are supposed to be enjoying!