

## Constructing TerraPrinting™ Units

(Not edited yet, sorry for all typos)

### Introduction:

Welcome to Paper modeling. Paper Modeling is somewhat rare here in the US, paper modeling is quite popular in other parts of the world. Paper Modeling is especially popular in Japan and England. It was used to make models of buildings and planes, blimps, just about everything has been a subject of Paper Modeling.

What is it? You print out a picture of something, usually on cardstock. Cut it out. Stick it together, and Bingo, you have a model. Shellshock is certainly not the first to use these models in a wargame, but I think we are certainly unique in that we are using paper modeling as our primary “miniature medium.”

If you look at our Mission Statement, you see that we want Shellshock to be free to everyone. The rules and the record sheets always have been, now, with the use of paper modeling even the miniatures are free. How do we make money? We have no idea, but hopefully we'll cross that bridge in the near future.

I'll tell you right now, I'm pretty new to this hobby also. (Paper modeling, not wargaming) I started making these models in an attempt to make wargaming, specifically Shellshock, accessible to just about anyone.

People's initial reaction to the idea of paper model miniatures ranges from uhhh, to whatever... In other words no one thinks it's a cool idea, or even a good one. Even Justin, the co-author of Shellshock pretty much stopped me for the last three years from working on it because he thought it was a bad idea... until he saw them :)

They actually look pretty darn good, if I say so myself, and even Justin agrees. And this is only the first incarnation of them. We plan on getting more detail, and eventually to have 3D types, but more on that later...

We've gone with the flat or “Pop-Up” format for a number of reasons. One, its easier. If you've had no experience with paper modeling you might think, “How hard can it be?” It's not hard really, but as with all things there is a learning curve. The first model or two you do might be tough. We are working with small parts here, and sometimes, somewhat intricate cuts.

Let me warn you, it could take as much as 15 minutes to cut out a typical “unit”, 45 minutes if you count the drying time. Some of the more complicated models could take 1.5 hours total. (Though some of the easy ones can be cut out in as little as three minutes if you don't count the drying time.)

All this for paper? I know it seems like a long time, but using the techniques that I will detail, the finished product looks like, feels, and even sounds like plastic. We've soaked the units in water for five minutes with little damage. If you use the more advance sealing techniques, not even prolonged exposure to water will damage them. It's been commented that these models are more durable than metal.

While I may not go that far, they are darn survivable, and short of the kind of damage that would kill a metal mini, they will do just fine. About their only weakness, compared to metal, is that they can't be stepped on, but, they survive being dropped. That can not be said for all metal minis. Plus you don't need any special packing for them. A 3"x3"x5" piece of Tupperware can hold your entire army. No foam, not padding, no special care. Rattle it all you like. So in my book paper is actually ahead.

Well enough about that, you're here, I don't need to convince you. Let's get to "building" your first Shellshock Pop-up.

### **Basic tools:**

hobby knife  
dull hobby knife  
white glue  
Clear Spray Enamel  
old magazine/newspaper

Hobby Knife: this would be the good old Exacto, or other hobby knife of this type. You can also use those "clicky" knives where you can snap off a blade, and have a "fresh" blade.

Dull Hobby Knife: this would be the good old Exacto, or other hobby knife of this type, that has gotten dull. You can also use those "clicky" knives where you can snap off a blade, and have a "fresh" blade. Just dull the blade by "cutting" a piece of concrete or stone. This is used for scoring the paper for a fold. If you are really good, you can use the sharp knife and just not apply much pressure, but you can cut through very easily by accident.

White glue: Good old Elmers glue. Also known as PVA glue.

Clear Spray Enamel: Can be purchased for a \$1 at a Mart Store. You can also get the brush on type. But the spray enamel is the easiest. You can also use clear spray lacquer. Both work well, but the spray enamel is much cheaper.

Old magazine/newspaper: to use as a cutting mat.

### **Really handy tools:** (in approximate order of importance)

Carbide knife sharpener  
self healing cutting mat  
metal ruler w/ cork backing  
double blade (Home-made tool)  
1/4 inch hole punch  
little alligator clips/little binder clips  
old "card" book  
paper cutter

Carbide knife sharpener: You would be amazed how quickly cutting through stock paper dulls a blade. Myself being as cheap as I am, would go through \$5 of #11 blades a week with the amount I cut out. Get a cheap little knife sharpener with carbide sharpening “blades.” A couple passes, and this sharpens up a knife tip almost as good as new. They only cost \$3, and a blade will last you easily 20 times longer.

Self Healing cutting mat: These are great. Small ones cost \$2, ones that are slightly larger than a sheet of paper at about \$8. Makes life so much easier.

Metal Ruler with cork backing: You can use the metal edge with the knives and not cut off slices, and the cork backing will keep the paper in place while you score and cut.

Double blade: This is a little tool you make yourself. You can use two dull blades, clicky types, or old #11. I used two old blades from a box cutter. Tape the two blades side to side. Apply a few layers of tape (and some paper just to be safe) around the blade. You only need a small amount of the two blades sticking out, no more than 1/8 of an inch.

You can also use two old #11, and with an extra “Exacto Blade” holder, you can fit both in there at one time side by side. But I think taping up two old box cutter blades works best. The Exacto way has to be constantly re-aligned and tightened. This tool is used often. In most models you have to “dovetail” pieces into each other. Use the double blade to score the slots as a guide for the sharp blade. Cost is about nothing but will be used with nearly each model.

1/4 inch hole punch: I’ve designed the units with turrets that can turn. So a tank turret will spin, and not fall off. I tried to use a 1/4 hole each time, so you can use a hole punch and save yourself a bunch of effort. Cost \$3, usually even cheaper.

Alligator clips/little binder clips: As you can guess these are great for holding parts together as the glue dries.

Old card book: These are the books that are given to kindergarten and preschool kids. They are usually pretty cheap. \$1-\$3. Get one that is at least 4.5 inches tall. An old hard cover book will work also, actually better, but you’ll probably rip out pages compared to the card books. Hint, go to the library. They give these things away all the time, same with the old hard cover books.

Paper Cutter: I’ve designed the patterns to print at the very top of the page. You then cut off what you need, and continue printing, thus not wasting any paper. If you use a paper cutter there will be no feeding problems. Don’t go and buy one of the guillotine ones either, far too expensive and potentially dangerous. They have small ones that cost about \$10 that just have this little piece of plastic, with this piece of blade no more than 1/4 long. You line up the paper and slide it along, and that’s it. You can find these by office supplies, or by crafts (scrap booking) in department stores.

I’ve seen small ones, that come with a hobby and a small self healing mat (a “startup” scrapbooking kit) for \$15.00

## Just showing off tools:

Rotary Punch: If you want to go nuts. You can also get a Rotary punch. It's a punch that has a few different size holes to cut into leather. Unfortunately they usually don't cut out 1/4, so you'll still need a 1/4 hole punch. This is really not necessary. There is only two unit's in the basic set of 24 that uses this size hole, that's the Badger and Artemis. The only reason I have one, is that my wife needed one anyway, plus the Badger is one of my favorite units and I'll be making a lot of them.

Compass: For helicopter units, if you want, you can cut out transparency film to look like the swirling blades.

(Note, this is just transparency, you can usually buy one sheet at a copy store for \$0.50. Just ask for a transparency with nothing on it) This is much thinner than the stuff that is used for metal minis, so at first it may seem too flimsy. But once cut out, a 1-3 inch diameter circle is plenty stiff for the light paper model) You can pick up the unit WITH the transparency sheet "rotor." Even with the thick clear plastic of a metal mini, you can't do that. Another plus for Paper!

While this can be done free hand on top of a printed out circle, the compass is much more polished. Luckily, hobby knives are usually about the thickness of a pencil and you can just replace the pencil of a cheap compass with the sharp hobby knife. But it has to be lined up just right. (You'll see when you try) You can just use the compass and knife to etch a pattern into the transparency, then use scissors to cut it out proper. Cost's about a \$1.

Super Glue: Sometimes there are times that the alligator clips and mini binder clips just won't do it. ("T" joints) Put down the PVA glue as usual, then one drop of CA. The CA will hold it while the PVA glue hardens proper. I wouldn't do this everywhere though. The bond is not quite as strong as a plain PVA glue joint. I prefer Loctite brand because like their advertising says, the tip won't clog, well it can, but it's tougher. (don't touch the superglue tip to PVA, it will clog real badly)

## Procedure overview:

- Print the model out
- Spray with Enamel
- Score and double
- Press Set
- Score slots
- Score folds
- Cut Slots
- Cut out model
- Assemble
- Finish model

Print the model out: Get card stock. Most card stock you can buy is 80 lb. test. It comes in a variety of colors. You can also get 110 pound test, its thicker, but not noticeably so. Locally I've only seen it in white, special colors can be ordered. But truly the 80 lb. is fine. Also you can go to any copy shop and they will sell you one sheet for 10 cents. You can get a pretty sizable army for only \$1 worth of cardstock.

Colors, and camo. The minis are just done in white with shading. There are several ways you can color your units. You can use markers, or paint them, but you can also print a camo pattern onto the card stock, then print the unit on top of the camo pattern. (we have a few patterns you can use)

Spray with Enamel: After you have printed out the unit, give it a spray with the clear spray enamel. I recommend giving it a mediyum spray, not heavy. Count to three and hold up to a light. The sheet should appear slightly transparent. Any parts that are still opaque, give a quick spray. Don't worry if you miss some spots though. Let this dry completely. Should only take about 15 minutes.

Score and double: Along the center of the printing you will see a pair of what look like underlined crosses. These run vertically. The center vertical line, line up with each other. Take a ruler and the dull knife and score right along these center lines. Fold at these lines and hold up to the light. You can see how the two sides line up and allow for things to be printed on both sides of one piece. Note where everything layers onto each other.

Take the PVA and using a swirling motion, put glue over all these places that will become pieces. You don't have to put down a perfect layer. The swirling action will create loops and circles, and when you press the sides together the glue will squeeze across the whole surface.

You will notice that there are circles with crosses in them. These can be used for alignment also. Take a thumb tack, and poke a hole in the center of two circles that will layer onto each other. After you fold the stock the holes should line up. You can even use the tack again to make sure by poking it through both holes.

Press Set: Take a piece of paper, fold it in half. Place the folded and glues stock in between. Place this inside of a book. Now put a weight on top of the book. Let it sit about 8-10 minutes. This is somewhat critical. While the glue is still moist, it is still easy to cut, especially when cutting curves. Once the PVA starts to harden... lets just say it becomes quite difficult, even dangerous, because you have to apply so much pressure to cut, you can easily slip and cut yourself badly.

Score & cut slots: You will find on most units a thick red line (You may have printed in black & White, but you can still see the thick red line online) These lines have to be completely cut out. Use your double knife tool you made, and score this. Don't bother trying to press hard enough to cut thorough. It will only clog up, trust me. Now take your knife and cut along the scored line, and ends.

Score folds: Now look to the "Folding & Cut Detail" sheets (Modern, Rebel and UN). These sheets show all of the units, with no shading, but it shows color lines. Blue lines show where the unit should be folded out, and green lines show where the unit should be folded in. What is the difference between inside and outside folds? If you picture what a six sided dice pattern would look like, all the folds are outside. Take your dull knife and score all outside folds. For inside folds, use the dull knife and press into the area a "dotted line". Kind of like perforating the paper, but not cutting all the way through.

Cut out model: The defined lines are what you cut out. It should be obvious what is one piece, and what shouldn't be cut from the rest. If there is white space around it, its one piece, only cut that out. Don't cut out the lines inside. Do not cut on the score lines.

Assemble: Take a look at the finished model picture and you should get a good idea of how it goes together. Where things slot into each other, but a small drop of PVA at the opening of one slot, and slide together. Don't bother cleaning up excess glue. It will dry clear.

(The models do not have them yet, but soon, all the model pdf's will have a sheet that shows one completed unit)

Turrets: You will find a square pattern that appears on most units that require a turret. Below is an example:



Along with this pattern you will see a red octagon as well as a red circle with a “cross in it” Use a standard ¼ inch hold punch to punch out the circle and cross. This is where the turret shaft will “rotate”. The octagon is glued to the bottom of the shaft (after insert through hole). The shaft is folded in half along the dotted line. The slit at the top, is... well slit. Then the two “ears are folded out and pasted to the bottom of the turret. On most tanks, this will be on the flat piece that the “gun” is part of.

Finish model: Let it dry and give one good soaking spray with the spray enamel.