Cheapo Set Construction

Welcome! It is my hope that this site will serve as both inspiration and guide to those who wish to enter into the world of filmmaking. Specifically, that aspect of filmmaking that pertains to set construction. What you'll find here is (hopefully) a simple guide to the basics of cheap set construction, and also, some plans on how to construct your own sci-fi fighter pilot cockpits (specifically, the X-Wing and Y-Wing cockpits from Star Wars). If you have any questions, please direct them to me at elichten@hotmail.com. If you would like to have pictures of your sets posted on this site, contact me also. If you do build a set with any help from these pages, please let me know how it comes out!

Set Construction Basics

Junk Collecting

Even before you start planning your sets, you should be collecting junk. But what exactly is 'junk'? Well, junk is the stuff that other people don't want, but that for some inexplicable reason, you do. The types of junk I collect are whatever people will give me. That strange shaped styrofoam stuff that comes with computers and VCRs is great. Those 'collector cups' you get at fast food places, broken computer parts (monitors, keyboards, circuit boards, etc...), loose wires, used up pens, cardboard boxes and tubes... anything. It'll take you a few romps through the local dump before you really become a 'garbologist' or garbage connosuier. Where do you get junk? The local dump, most recycling plants. Toys-R-Us will often give you the styrofoam packaging from returned toys. If you see a particularly interesting looking pile of junk on the side of the road, stop, and root through it. Yeah, people will look at you funny, but you'll be glad you did it later (and it's more fun than you think). What are you going to be using this junk for? Who knows? Most likely, you'll be using it to add details to your set.

NOTE 1: Keep a clean workspace. If your workspace is part of a shared environment, keep it clean. You'll quickly anger roommates, spouses, and parents if you're leaving your stuff all over the house. It may be set material to you, but it's junk to them.

What is this stuff? Plastic and cardboard tubes? How about wire conduits or rocket launchers!

Tubes, boxes, plastic containers, floor vents - all good junk.

Packaging material - cardboard, Styrofoam, and plastic - *great junk!*

A distributor cap, little painted things, some plastic cases...great stuff!

Tools and Materials

Set building is a construction project, and like any construction site, yours will be filled with tools. But don't despair! You don't need a $7,000 pneumatic hammer that also does you laundry (although that'd be cool). All you need is listed below:

1. Tape Measure
2. Kitchen Knife
3. Fat/Wide Tipped Magic Marker
4. Dull Tipped Colored Pencils
5. Duct Tape
6. 5/16 Wooden Dowels (150" - 300" per project)
7. Elmers Glue
8. Spray on adhesive
9. Small Hand Saw
10. 2" Wide Masking Tape
11. Fine grain sandpaper
12. Water based or latex paint
13. Foam brushes and foam paint rollers
14. Foam Insulation - the most important part. I suggest the 8'x4', 1" thick sheets.

Tools - kitchen knife, tape measure, fat tip magic marker, dull tipped colored pencil

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Marking the Pieces

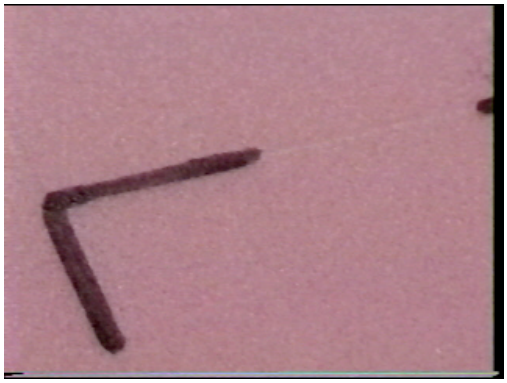
Alright, this is the first step in which you actually starting doing damage to, uh, marking up the large foam insulation pieces. You've reached this stage only after you have finished making extensive plans/blueprints. Haven't done that? Think you're good enough to just jump right in? Well, you're not. Go sit in the corner and think about what you've done. And while you're at it, detail up some plans. (Lazy? Well, at least use my plans. Well, use them when they're ready.)

Ok. Following your plans, measure out and mark your lines on the insulation sheets using the tape measure and the DULL TIPPED pencil. It's gotta be dull, or you'll leave tear marks along the insulation. I suggest a dark blue pencil - that seemed the easiest to see. When marking your lines with the pencil, you want to leave a little groove in the insulation. This will help to serve as a guide when you're cutting later.

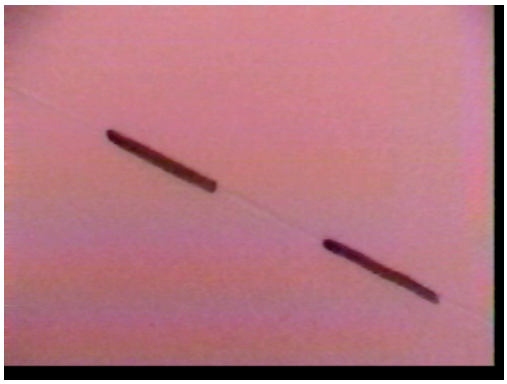
Once you've got your pencil marks, you'll notice that they aren't really so easy to see. That's what the FAT TIPPED magic marker is for. If you can't figure out why it's gotta be fat tipped, re-read the previous paragraph 'till you get it. With the marker, add some hatch marks along the pencil lines. This is really just to make the lines easy to see during cutting.

NOTE 2: Label Everything! While at the Marking stage, use the magic marker to label every piece with what it is, and where it goes, and which side is the inside or the outside, which end is up, which end faces forward... (Try to label pieces on the side that WON'T be painted later, or you'll only have to re-label.) This is super important, so don't ignore it!

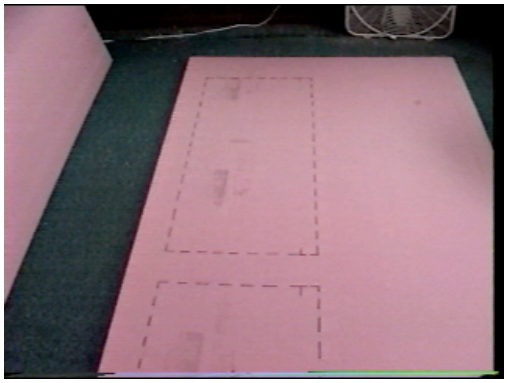
While making your lines, feel free to sit on the insulation. Otherwise, you're gonna have a hard time reaching everywhere. However, SIT (indian style is good), don't kneel. No elbows or knees allowed - you'll put a dent in the stuff.



Notice that the corners are always covered in marker.



Here's a good shot of the indented groove made by the pencil and the lines from the marker.



A long shot of a fully marked up sheet of foam (from the Y-Wing set).

Cutting

Before you make your first cut, you must be aware that cutting is final. Once you've made a cut, that's it. If you've messed up something in your plans, or measured wrong, you've got problems. So, before you start cutting, stare at your marked pieces for a while. Make a few test measurements, just to make sure. Have a nice long sit on the throne and think about what you're about to do. If you get to this stage and you're too nervous to cut, you may want to call it an evening and re-think med school.

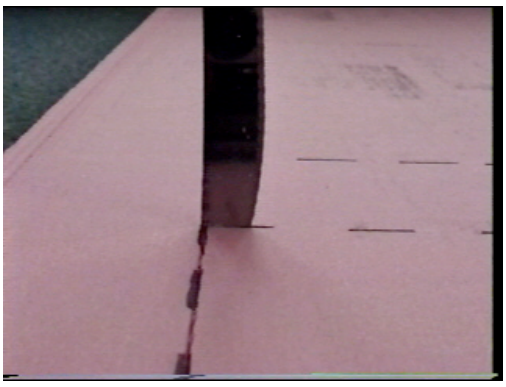
NOTE 3: Remember, the knife is sharp. It's made for cutting meat. Hey, wait a minute, humans are made of meat! See where I'm going with this? Be careful.

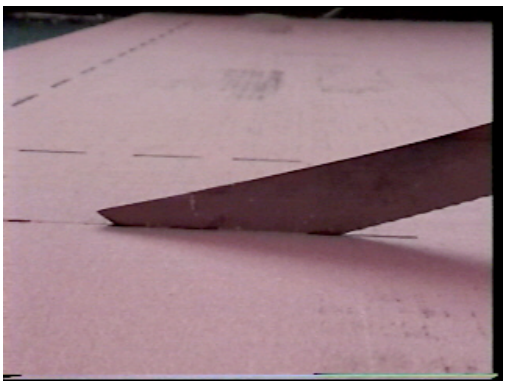
Before we start - all cuts are made in one direction only! Once you've inserted the knife into the foam, you NEVER pull it back out. Make no sawing motions. 'Drag' the knife along the through the foam. By 'dragging' instead of 'sawing' you'll get smoother edges.

I found it best to cut on a soft surface, like carpet or astroturf.

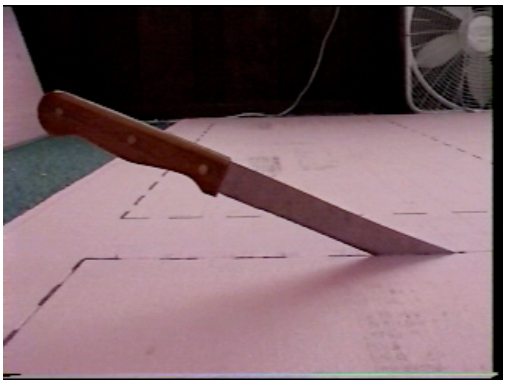
NOTE 4: No Distractions! Keep children, siblings, and pets out of your work area. They may be cute, but I don't think I need to tell you the outcome of Fluffy Vs. The Bandsaw.

Cutting is made in three stages - shallow, medium, and deep. The shallow cut is the first one you make. It cuts maybe 1/4" into the foam. The second cut is the medium cut - this cuts another 1/2" into the foam. The third (and often final) cut, goes all the rest of the way through the board. When you're pulling the knife along at this depth, you should hear a popping sound. This is normal and good. It means you're cutting all the way through the board. Don't worry if you've got scrawny arms and it takes 4 or 5 cuts to fully cut the board. Also, no one cares if you can cut through the whole thing in 1 cut. Use a minimum of three - each cut provides an alignment groove for the next one. Don't rush, and things will look better.

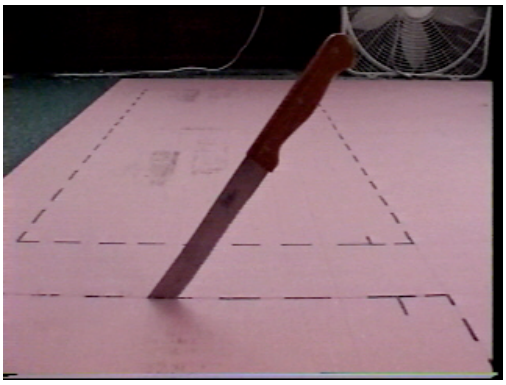




Inserting the knife to start a corner cut.



The approximate depth of the shallow cut.



The approximate depth of the medium cut.

The approximate depth of the deep cut.

Assembly I No, this isn't a computer science class, this is the step where it *really* starts to get fun. If you were having heaps of fun before, you're gonna want to change your drawers before you start in here.

You've got all your pieces cut out. You've got then all LABELED, right? (If not, go read Note 2. It's a big orange box designed to catch your attention. Then go see your eye doctor.) Well, start putting them together! Set them up so that the whole thing stands more or less the way it's supposed to. Hold the pieces together with small pieces of duct tape, and support some of the larger standing pieces with weighted cardboard boxes.

Now go sit/stand inside it. You know you want to. Indulge.

Cool, huh?

So, beyond being cool, why'd we do this? Well, by setting the whole thing up, you can get an idea of how it all fits together. Check the fits. Some pieces may need to be sanded down, or you may need to make some larger-scale adjustment cuts. I suggest getting out your camera (if you've got one) and take some test footage. Looking through the viewfinder will give you the best idea about what changes (if any) need to be made to your set.

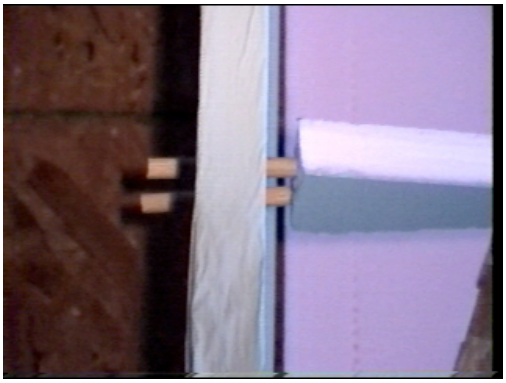
If you need to make changes, get out your tape measure, pencil, and marker, and mark changes just like when you were marking pieces. It may be a little harder with things standing up (and in a not so stable way, to boot).

Attaching pieces at right angles. Don't try glue. Use wooden dowels like nails. Using a drill bit, punch a hole into each piece that needs to be attached. Then, simply slide the wooden dowel through both holes, and voila!

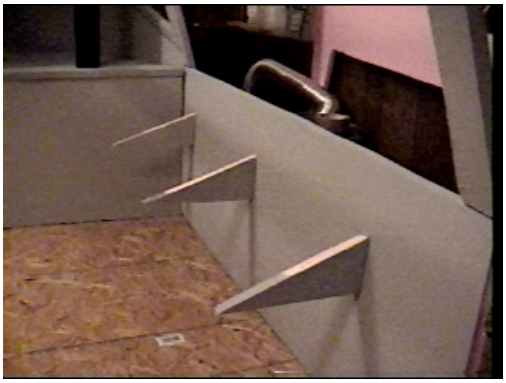
3/4 view of the Y-Wing set. Notice how the roof doesn't quite match up? Gonna have to do some tweaking...

Y-Wing cockpit as seen from the side. You can see the window fan (lower left) being used to hold the set upright.

Y-Wing cockpit seen directly from the front. The pilot would be sitting in front of that center cross piece.



A pair of dowels used to hold a piece in place.



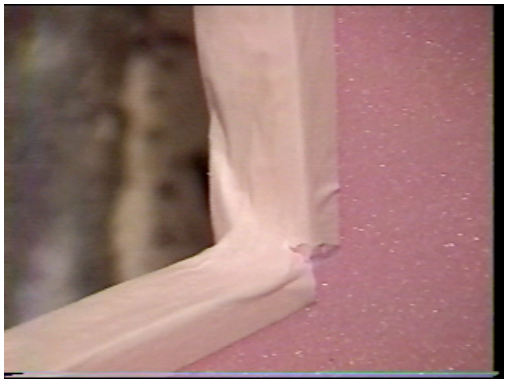
A series of pieces attached to a wall using the dowel method.

Painting

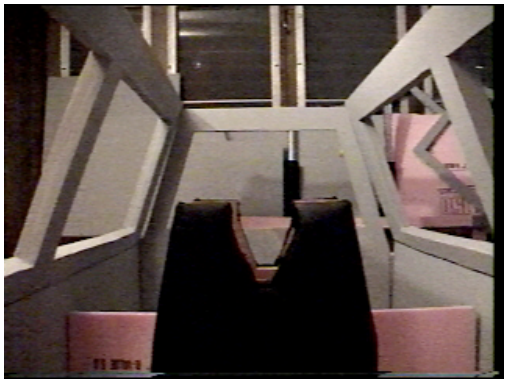
This step is kinda boring and slow. It involves a lot of paint drying. But before you can paint, you need to do something about those rough edges you've got. To finish edges, all you need to do is sand them down so that they're kinda smooth, then run some 2" wide masking tape over the edges. Very simple. Don't spend time with spackle or obsessive sanding. No one but you will ever know anyway.

Paint. Make sure you get water-based or latex paint. Anything else will eat away at your foam insulation. This means no spray paint. (However, it does provide a cool effect. On a piece of scrap foam, spray it with some oil-based spray paint. The effect may be useful for you later.)

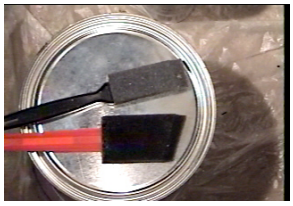
As for painting, use the foam brushes and foam paint roller pads. They leave a nice smooth finish, and they're real cheap.



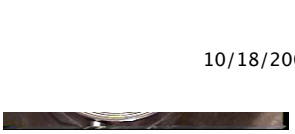
An example of masking tape run around the edges to make them smooth.



A partially painted (and assembled) Y-Wing set. In the background you can see



painted X-Wing pieces.



Foam brushes, and one normal brush (which I used during the detailing phase).

Detailing

They say it's all in the details. Well, I don't know who they are, but they're right. Just a few details will add to the realism and beauty of your sets. Remember all that junk you've been collecting? Well, this is a good place to use it. Where exactly to put which pieces of junk/details is up to you. Either do what you think looks good, or try to follow some kind of guide (such as a picture of a fighter cockpit you're trying to emulate). You'll find that it can be quite challenging and fun to try to figure out how to make some piece or pieces of junk look like a certain detail you want to achieve.

As for attaching the details, well, that depends on the detail. For attaching Styrofoam, I suggest a mixture of spray on adhesive (for large surface areas), Elmer's Glue (for small surface areas), and nails. Simply push the nails through the pieces of Styrofoam you want to attach, then run glue down the seams.

Attaching other details may require you to get more creative. For instance, tubes can be attached using fishing wire looped through the set.

For some details, it better to paint them first, then attach. For others, you'll be better off attaching them first, then painting. I'll leave that decision up to you. (I can't tell you everything!)

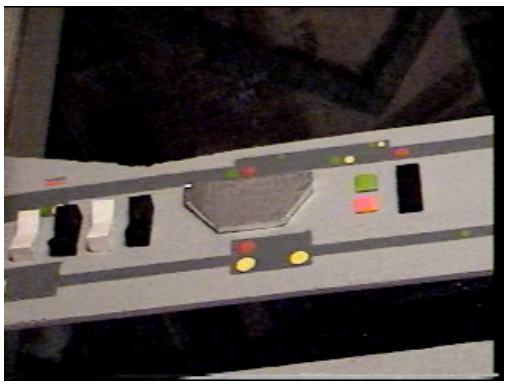
NOTE 5: Remember, you're building movie props - not collectors items. You don't need to get anal about details. If you're standing 3 feet away and have to really look for a detail, then your audience sitting about 8 feet away (after you figure in the camera) isn't going to see it at all.

NOTE 5a: Set up your camera when you're setting details. Some areas of the set simply aren't going to be on film. Don't bother putting details in those places.

NOTE 5b: Take pride in your project! Sometimes, you just want to add that certain little detail in - do it. *You* need to be happy with the set when it's finished.

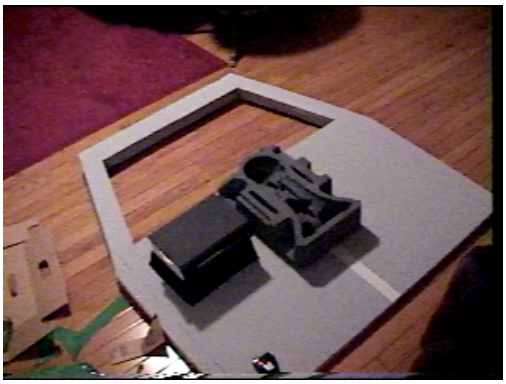
This painted cardboard tube is held to wall by a nail (see the head in the center?).

That same nail from the other side. Don't forget to push some spare foam over that tip!

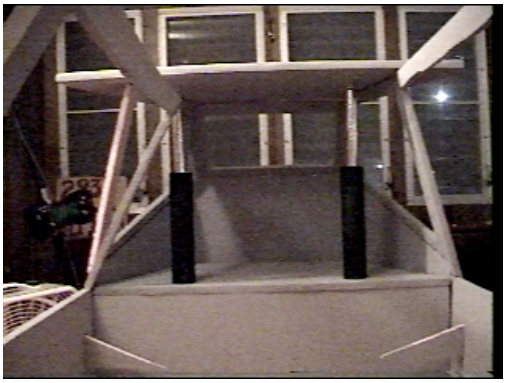


Details on an X-Wing control panel. Some details are painted directly on, some are shapes cut from left over insulation foam, then painted and glued on.

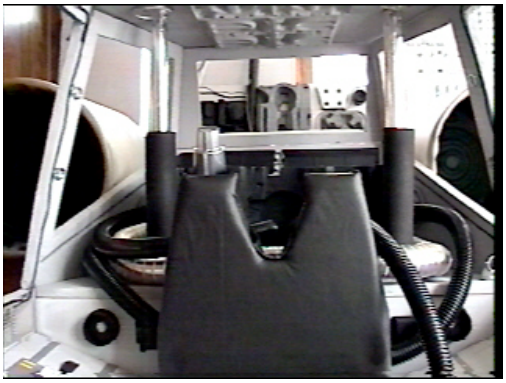
A section of roof - nothing more than egg cartons and paint.



Some painted Styrofoam pieces glued down for some extra texture.



The X-Wing set with no details (pretty dull)...



The X-Wing set with most of the details in place. A whole lot more interesting, eh?

Building the Seats

Building seats sucks. I didn't have a lot of fun doing this part of the project until it was over. I guess upholstery and I just don't mix. I suggest you go to a junk yard, give the guy some money, and tear some seats out of an old car. Really. This is what I plan to do next time.

But, for those of you who must do this yourselves...

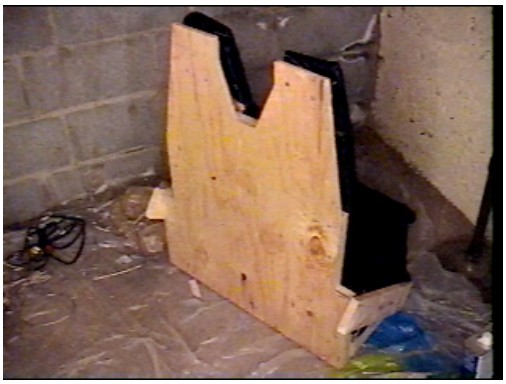
Treat the construction of seats as a mini project: 1-make plans, 2-mark pieces, 3-cut pieces, 4-assemble 1, 5-upholster, 6-nail the rest of the thing together, 7-pop back a beer and reflect on how you wish you'd listened to me in the first place.

Sorry, but I forgot to take pictures during the upholstery stage.

The seat bases. Left - base with pieces arranged properly. Right - base with pieces arranged kinda properly. (Notice that all the pieces are labeled!)

A view of the underside of a nearly completed chair.

The nearly completed chair from the side.



The same stupid nearly completed chair from the back. (I can hear your screams of

The (finally) completed chair, all painted, from the back.

joy and elation.)

Assembly II

Here it is, the final product. When putting the whole thing together, write down what order parts need to be assembled in. Chances are, on filming day, you won't be the one putting it together. These notes will be invaluable for whoever has to put the thing together. Better still, if you know who will be re-assembling the set on filming day, have them around for this stage AND write down the assembly order.

Note 6: Get an opinion. Have someone not associated with your set, or even your film, look at the set. Have them tell you what they think is wrong, what's missing, or what they would have done. This advice can be invaluable.

Filming Day

Checklist for Filming Day:
1. ALL your set pieces - this includes any of those weighted cardboard boxes that you need to hold your set upright.
2. Masking Tape
3. Paint
4. Duct tape - just in case

Set things up while your actors are getting into costume and make-up. (If you think your actors don't need make-up, you're kidding yourself.) Remember that sheet of assembly instructions from the last step? What? You lost it. Well, blame it one someone you don't like, yell at some stage hands, and I'm sure the problem will sort itself out.

Yeah, right. Make sure you don't loose that sheet. When you've got a million other things to do on filming day, at least set construction can be one less.

Anyway, set up the set. Get everything into place. Once the proper lighting is arranged, check ALL the camera angles that you'll be using. Do any set tweaking that you might need, play around with lights if you have to.

You should still have some visible seams at joints where pieces meet. You can solve this problem by running some masking tape over the seams, making a flat surface. Then run some paint over the tape. Yes, it might be a little wet when your actors get into the set, but just tell them about it. Chances are by the time you've done a few takes, it'll be dry.

Otherwise, good luck, and happy filming!