

BASIC BUILDING,
or,
Tips Toward More Rocket Fun
by Bunny

Now that winter is upon us, it's time to start doing two things. (a) Asking Santa for all the hobby goodies we want to see under the tree, and (b) getting ready for the next flying season. Hopefully, this short series of articles will benefit you old and new NIRA members. We'll be trying to print even more simple, easy to remember tips and hints for more enjoyable flying in later issues.

While some nuts will ignore Ric Gaff's advice to stay inside for the winter, most of us put the trusty launcher away. WAIT! Before you do, check things over. Are your wires shot to pieces? Are your battery clips rusted and poorly attached? Have your micro clips seen better days? I know mine have. How about spending a few minutes cleaning up that mess and repairing the abuse of the long flying season?

Not enough launch system left to salvage? Why not take the easy way out and look through the Estes catalog and ask Santa for a new one? I'd suggest the "Astron Launch Control System". It uses a car, lantern or Gel-cell battery for power. Those provide more power than the alkaline battery powered launchers. You'll have fewer frustrating misfires. Its wire is heavier gauge stuff, too, so it'll last longer.

Launch system OK, you say, but the batteries have had it? Try getting one of those nifty Gel-Cell batteries. A good RC hobby

shop has them and chargers for them. A good quality 6 volt, 4 amp-hour cell and charger will run about \$25. It's cheaper to use those AA cells, but remember all those non-launches at Ackerman Park this summer? You really don't want to do that again. A reliable power source is a rocketeer's best friend.

While cleaning the launch system, check out the launcher as well. Clean off all that exhaust residue. It's terribly corrosive, especially to metal. Your launch rod and blast deflector will be "grody to the max" next spring if you don't clean up now. If your launch rod is rusty or bent, replace it with 1/8" dia. steel music wire. It's available at good hobby shops. You can get 3/16" dia. as well. If you're really tired of cleaning launch rods at every launch, go to a good welding shop and get some stainless steel rods. They never rust, and can be purchased in lengths longer than 36".

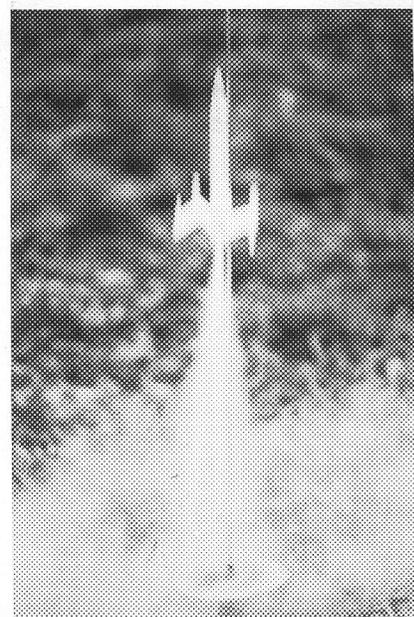
Everybody can use motors, right? OK, so put some on Santa's list. If you have motors left over, it pays to store them right for the winter. Ask Mom to let you have an empty coffee can and plastic lid. These are great storage containers. They keep engines dry, and dry engines work better. If you put a label on the lid with the engines listed on it, you don't have to rummage thru the can to see if you have a B6-4 for your "Starburst Special". Your engine list will be right there for you.

If you take launcher, launch system, battery and motors and store them in a single box, they won't get

kicked around the basement and garage this winter. If you label the box, you'll be able to find it and be completely ready to truck out to the launch field come springtime.

Lastly, you should look over your "fleet". Broken fins, smashed body tubes, missing launch lugs and forgotten decals are all good canardates to start your winter building session. If you fix all those tangled, burned and "shroud-line-missing" parachutes now, you can store away good, flyable models for next year's first launch. Reviewing the status of your models is also a good way to list either parts or kits Santa could put in the stocking for you.

Now that we've cleaned up this flying season's activity, and prepared our list for Santa, we'll move on to our warm, cozy workshop. Next issue we'll discuss building better kits and making your own kits. Till then, dodge them snowflakes.



BASIC FINISHING

YOUR MODEL'S NOT DONE UNTIL ITS FINISHED

A lot of NIRA members come out to launches with unpainted rockets or with models given just a heavy coat of a single color. While it's always nice to get out and fly your new creation, taking a bit more time can result in a model guaranteed to turn head on NIRA's range or better yet, win you "Model of the Month" honors at our next meeting. It's not that difficult to get a good finish on your models. It takes a little patience and the few tricks of the trade we'll be outlining here.

To start with, take your time in the basic construction. If you drip glue all over your body tube, or don't cut out your fins straight, no amount of careful paint work will hide those mistakes. Use only the amount of glue necessary, and watch where it goes. If you do get some Titebond or Elmers where you shouldn't, don't despair. Get a damp paper towel and wipe it up before it sets. A damp towel won't harm your model and will clean things up nicely. If you're using epoxy, thinner will work the same trick.

Your model will look much better if you fill in the seams of the body tube. Two ways exist for doing this. The traditional way is to paint repeated coats of sanding sealer onto the seams until you get everything filled in. A faster way would be to use some putty to fill it in. Most scale model builders suggest you use Squadron Shop "Green Putty". You can buy it at Squadron Shop's store at North and 83, or in

other hobby stores around Chicagoland. Use only the amount you need to fill in the gap, and don't try to do the entire seam at once. Work a little bit at a time and don't hurry. "Green Putty" dries hard as a brick, and you'd rather be flying than sanding, wouldn't you?

When your assembly is finished, and you've filled in the seams (or chosen to ignore them), give the model a through going over. Any larger gaps or holes can be filled in with more putty or some spackle (!). Sand the entire model lightly with some 320 or 400 grit sandpaper. Carefully wipe the model down with a dry rag or tack cloth. Then get ready for the "patience" part.

Sanding sealer is a must to fill in balsa grain. You can buy commercial sanding sealer, or make your own. To make sealer, take some baby powder (just like that you powder your chutes with) and mix it with dope thinner. When you get a fairly large amount mixed in, mix in enough dope to thicken the mixture. Viola! Instant sanding sealer! Brush the sealer on in a fairly heavy coat and let it dry thoroughly. Sand nearly all of the first coat off. You aren't trying to build up a thick layer of goop all over your model. You're trying to fill in the low spots. Repeat the procedure with progressively thinner coats and lighter sandings. When you're satisfied, you can quit. Perfectionists have gone through as many as eight coats of this torture!

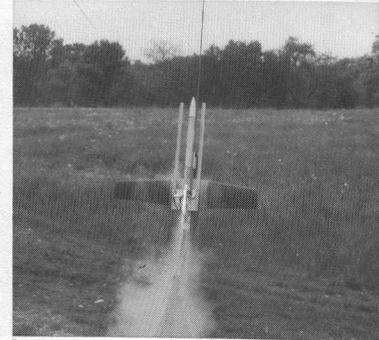
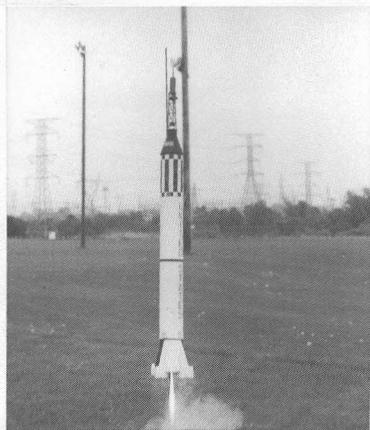
A potentially faster approach may be epoxy paint. I used this on the original "This Old Rocket", and found it to fill in grain faster than you could say "I'm out of sandpaper, Mom." It added a lot of weight, and the paint isn't cheap, but if you're in a hurry, it may be the ticket.

Another fast way to fill in those nasty fins is to simply rub in some baby powder into the fins, then paint on clear dope. I've used this method more than the home-brew sanding sealer, and like it a lot. Try both before you stick to any one method.

After you're perfectly satisfied with your surface, try one last look at the bird. Hold it up to the light at different angles and you'll quickly see where the surface imperfections are. A base coat of paint will also help point out bad spots. Silver paint is particularly good for showing up flaws. Light gray, flat white or rust are also good base colors.

If you're spray painting, put paint on in light, even coats. Don't try to cover everything at once. When painting a multiple color paint job, start with the lightest color first. They're the easiest to cover up later. If your bird is going to be yellow, blue and black, paint it in that order.

When masking, be careful. Masking tape is pretty sticky stuff, particularly with enamel paints like Testors. Try reducing its stickiness by tearing off a piece of tape and sticking it to your pants leg a couple of times before you stick it to the rocket. I've also been told drafting tape, sold in artist supply shops, is good for masking purposes. In all cases your base coat should be thoroughly dry before you try to mask. Krylon paints are particularly fast drying. Testors will take at least a day to dry out, so beware!



WINTER FLYING...

IT CAN BE DONE!

The first club I was a member of was SCAM in Ft. Wayne. It was a good club with good, if some what crazy, people. One thing we did the first few years (the early 1970's) was fly in the Winter. It took us several years to realize what a mistake that is!

For those of you who want to fly in Winter, here is my best advise. **FORGET IT!!** Take my word for it. It's miserable! But if you're as gung-ho as we were, here is some second best advice.

(1) Dress warmly. This sounds obvious (at least it should) but you would be amazed at how many people don't.

(2) Have a warm place to prep models or at least a place out of the wind (a car is a good spot). A warm place to retreat to when you get too cold is also good. We had a Mac's nearby.

(3) Pick a reasonably warm day. If the temperature drops below freezing, forget it.

(4) Your rockets will need extra care. Balsa and plastic tend to get brittle when they get cold (As a matter of fact, so do I). Fins tend to break real easy. Hot Stuff and epoxy won't work worth a darn.

(5) Parachutes have to be kept warm or they'll take a "set", and freeze into position. Leaving a model on the pad too long is a good way to test those brittle fins!

(6) Batteries have to be kept warm, too. Otherwise, they're not going to have the power to launch your model. A car battery is usually the only exception to this rule.

(7) Finally, stay home! Watch the A-Team, read a book, build a rocket, read your Leading Edge, do your homework (horrors!), do anything but forget flying rockets till it gets warmer.



January 1971. These guys came from Ohio to fly rockets and a "concrete block". It flew like one too!

HINTS FROM MISTER STRATO'S WORKBENCH

by Lawrence Bercini

Recently, I had the opportunity to build several Estes kits. These ranged from Skill Level 1 to Skill Level 4, but all required techniques that I'd like to pass along.

Most kits now come with die-cut balsa fins. When you get to the step in the instructions where you remove the fins from the sheet, take a little time to trace the patterns on to index cards. Label the grain direction and number of times this pattern is needed for this model. The fin marking guide should also be saved. Label the index cards and marking guide with the name of the model and put them in an envelope, also labeled with the kit's name.

This only takes a few minutes to do, but can be very helpful.

As I built an SR-71 and was in the process of gluing on the bottom rudders. I realized I had lost one, but not until I'd

glued the first one on. Fortunately, I had a pattern traced, so I could make a replacement.

Some kits come with shock cord anchors printed on index card stock. Throw them away! They are too thick to work with. Other kits come with the shock cord anchors printed onto the middle of the fin marker guide. The kind of paper is OK, but using it will ruin the marking guide.

An inexpensive and workable paper for shock cord anchors is from a standard brown paper grocery bag. Copy the kit pattern onto the brown paper, cut out and prefold, then smear on the glue. Once the glue gets a bit tacky, assemble the mount with the shock cord in place. Then, since the paper is soft and pliable, it can be easily shaped to the curvature of the tube. That way, when glued in place, the mount will create a secure bond with a minimum obstruction inside the tube.

Once the model is complete, we're at the step most modelers rush through: finishing.

Equal care should be made for

as was for construction. When applying fillercoat or sanding sealer, apply carefully! Apply the sealer smoothly and evenly over the balsa surface just as if it were a paint job. The better you apply the sealer, the easier the sanding will be. Sanding off a thick drop of sealer can be done, but you will almost assuredly sand too much off the surrounding area in the process.

Avoid getting sealer on plastic parts. However, it is good to put sealer on body tubes. In fact, a coat of sealer on a tube and sanding smooth not only enhances the finished appearance, it improves paint adhesion and makes color masking easier.

On the topic of masking, let's not forget the greatest boon to spray painting ever invented: coupon inserts. In your Sunday Tribune comes a handful of glossy paper advertisements with clip out coupons. If you don't need to save 50 cents on Kibbles and Bits, save that whole sheet for masking material.

Many kits, like the Sizzler, Wizard and Phaser, require large portions of the model be masked off while a second color is applied. Use that advertisement to cover all areas

Mr. Strato (con't)

to be left unpainted. Do not try to get by with masking only the part adjacent to the color. Overspray is creative and will get on the rest of the model. The nice thing about glossy paper is that its ink won't rub off on the model, it won't let paint soak through, and it's cheap!

Plastic parts make model building easier but require an extra step during painting. Suppose you paint your Big Bertha all yellow. Because the plastic nose cone is somewhat translucent, the model will actually appear to be two different shades of yellow as the light "leaks" through the nose cone.

To prevent this, I always use a dark primer coat on my models. Since I use Krylon paint on my sport models, I use their grey sandable primer which covers well and can even be buffed with steel wool to achieve an ultra-smooth finish before applying final colors.

Here's another nose cone hint. Before painting, slide the cone up out of the body tube just a little bit, no more than 1/8 inch.

Just a little bit of color paints the shoulder of the cone, but doesn't interfere with the nose sliding off and on. I do this because models, particularly ones painted in dark colors look less realistic if the glaring white plastic shoulder peeks out of the tube.

Finally, the finishing touches, the decals. Kit decals will usually have their clear film extend well beyond the edges of the colored part. When the decal is a roll pattern or is to be applied to a large flat area, there is not problem. But whenever the color area is to fit within the outlines of the model, the clear film becomes a pain.

For example, the Nova Payloader has decals which fit exactly within the shape of the fin tips. To aid in fitting these decals in, remove them from the decal sheet with a SHARP knife and straight edge, cutting just a hair outside the color lines. Apply these decals as you would normally.

There you have it, some hints from Mr. Strato's Workbench. I hope these hints will help make your building easier and give you better results.



Author with Mickey Roc at NARAM-24.



Making chutes: a tedious but necessary part of model rocketry.



Oops! Something to avoid.

BASIC TIPS FOR PLASTIC MODEL CONVERSION

by Bunny

With MWRC and NARAM both sporting Plastic Model Conversion (PMC) as events, you need to start planning for this difficult event. Difficulties begin when you start thinking about three engine clusters and worrying about tiny details on your model. PMC isn't difficult **if** you stick to model rocket basics and strive for reliability.

When you dash off to the hobby shop searching for a conversion, ask three questions of every kit you examine.

Can I make it stable?

Is there room for a recovery device?

Is it light enough?

Stabilizing a PMC is your top priority. There are three methods for achieving stability. The classic "add a lot of nose weight" works well for most jets like the F-104 or F-16 (i.e. move the center of gravity (CG) forward until the model is stable). I prefer lead or solder for weight. You can pack in a lot in a small space. A second method is to attach either clear or opaque plastic fins to the rear to provide more fin area. (i.e. move the center of pressure (CP) rearward) This method is popular with older rocket and sci-fi kits. A final CHAD method involves extending the body tube out beyond the plastic model itself. The model itself acts like "fins"

while you put a lot of nose weight in the body tube, just like a regular model rocket. Judges aren't too fond of this method.

To find the CP of your model, use the "cardboard cutout" method. Trace the outline of your PMC onto some stiff cardboard. Cut out the outline and balance it on a ruler. Where the outline balances is a rough estimate of your CP location. As long as the CG is ahead of this point (i.e. towards the nose), your model will probably be stable.

Now we turn to recovery. PMC's are probably disqualified more for recovery failures than for any other reason. They are heavy models and are no place to be using an undersized parachute. Damage on landing means lost points and a repair job for the next meet.

You can avoid lots of recovery problems by picking the right model. I've converted 1/72 scale jets and they're cute, but you really have to squeeze in the chute. The 1/48 scale kits have much more room; I'd recommend this size to beginners. Recovery system room isn't usually a problem with 1/32 scale models; they are HUGE!

One novel way to get more "room" in a kit was suggested by John Beach. He converted the 1/48 scale

Mirage 2000 into a "Batplane" with some clever detailing. But since the Mirage's cockpit was narrower than the BT-20 used to hold the engine, John simply made the wing his "nosecone". By blowing off the entire wing section, John used the entire forward half of the fuselage for parachute storage and simplified his conversion. Lawrence Bercini considered doing the same thing with his F-16.

A visit to "Weight Watchers" is next. Plastic is a lot heavier than paper and balsa. Many PMC's are underpowered, and while they might work on calm days, they crash in windy weather. So heed this advice. Take all your plastic kit parts, tubes, nose weight, recovery system, engine, etc. and weigh them all together. Now divide the total weight by the number of Newton-seconds your motor provides. If the ratio is over 15 grams per Newton-second, consider increasing your engine power or get another model. You can also consider lightening the bird by eliminating all unnecessary parts.

Two tips concern launch lugs and centering your body tube in the model.

Launch lugs should be for 3/16" rods or larger. Why? Because they're

BASIC TIPS FOR PMC (con't)

stiffer, larger rods will insure a straighter start to your flight. Launch lugs should be placed parallel to the body tube holding the engine and as close to that tube as possible. There's less chance of binding on the rod that way.

Sometime kits contain internal bulkheads that can be used to center the body tube in the model. Just cut or drill out a hole to the correct size. While you can also make your own bulkheads from plastic sheet or plywood, I gave that up a long time ago. I simply wrap 1/4" wide masking tape around the tube until I've got a ring that works. This method leaves some gaps between the irregular surfaces of the model, but so what? With some epoxy

fillets on each side of the ring, the tube isn't going to move anywhere.

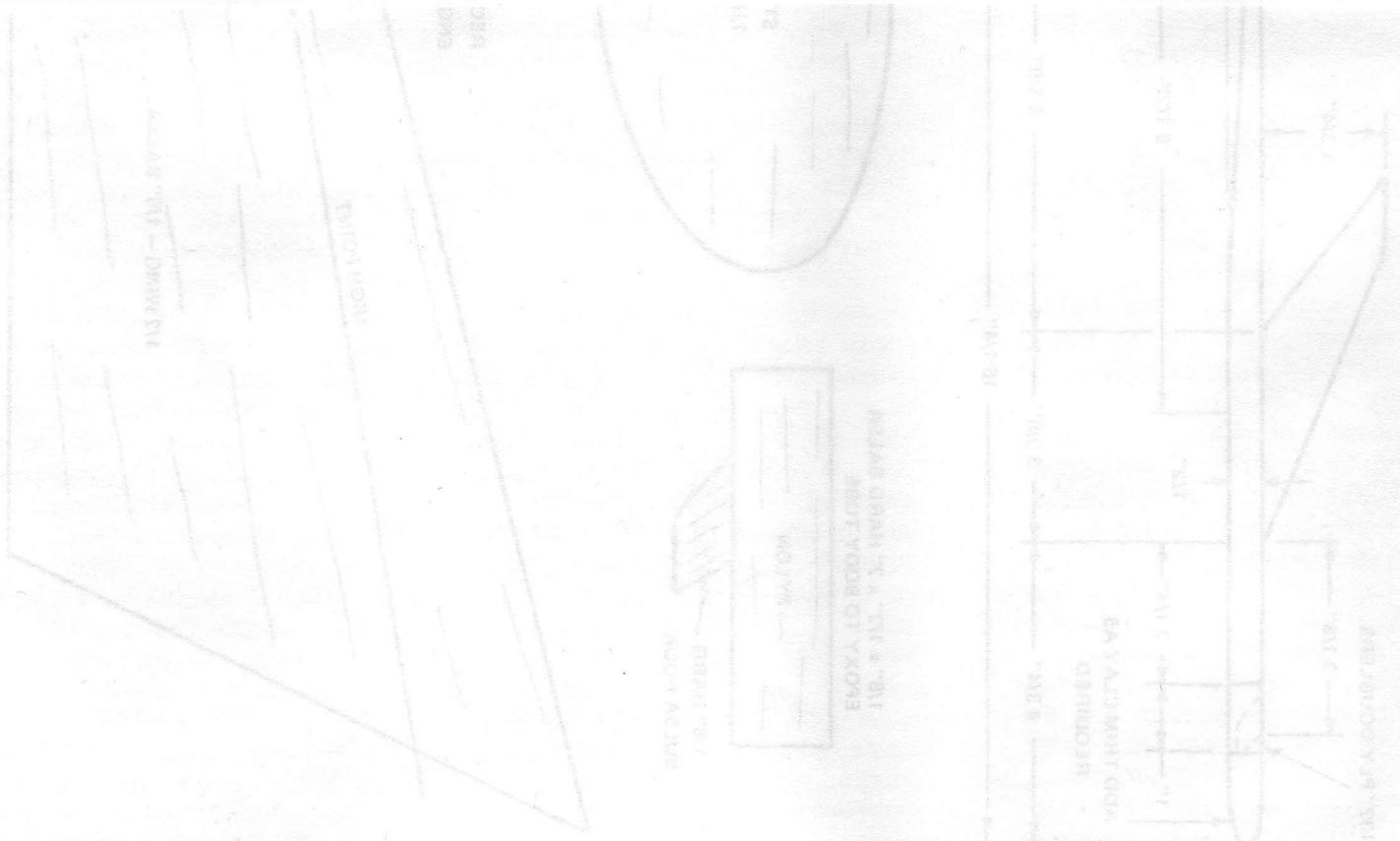
When you're done installing all the goodies, it's time to paint. I recommend "Squadron Shop Green Putty" to fill in seams and spray paints. Use a base coat of paint before you put on the final coats, and remember to spray on light even coats. Trying to paint a plastic model all at once means runs and drips. If you want to add details, raid your spare decal collection. Decals can be cleverly used to hide your mistakes and break up the dullness of even a one color paint job.

For flight, double check the recovery system and make sure it's up to the

shock of ejection. Prep carefully; I once lost a chance at a NARAM place simply because I spit my engine. Powder your chute well and use sufficient wadding.

Whenever you think about PMC, remember that many flights are disqualified for basic model rocket mistakes. Anything you do to improve the reliability of the model will work to your advantage. And never give up. PMC can be a lot of fun and provide your fleet with some models you can't get anywhere else.

(And I thought all you had to do was ream out the middle and stick a tube in!
-- Barb)



HOLD THAT ROCKET!

or how to keep your rockets looking great by Douglas M. MacMillan

Let's face it. We all put in a wealth of time and effort into producing these sky piercing devices we call model rockets. Why in the world should we then resort to sometimes careless or even concealed storage of these objects of our labor and pleasure.

We shouldn't! After all, we launch them and recover them intact, including the spent engines. And there's the answer to storage problems you've been seeking all the time - the spent engine.

Think for a second. Nothing, but nothing, fits your rocket's engine holder better. Don't trash that smelly little tube just because its active job is done. Give it a passive job to last years longer and help protect the bird it powered aloft.

First, clean it up. A simple test tube or baby bottle nipple brush will scrub out the residue that can't be shaken out.

Sand the nozzle end lightly to remove residue and you're ready to get full value out of that engine.

Give the star of your rocket team its own special stand. Square a 2x6 to 2x6x6, then mark the top with a big "X". Mark each leg of the X 1 3/4" from the center. With these four points, mark out the resulting square. Carefully cut along these lines to form a chopped pyramid (See figure A).

Sand and stain or paint as you wish.

Coax a four penny, cement coated nail through the nozzle from inside a spent engine. Center the nail on the stand. Using a pin punch, nail the casing to the block. Letter your rocket's name on one slanted face. Paint the lower part of the casing flat black. Let dry and display your rocket. Your "star" now has a stand to shine on!

An alternative to nailing is to use a #6 x 1" wood screw through the nozzle and screw the casing into the base. Or prior to painting, glue the casing on. You'll have to mask the base before painting the casing flat black. If you're really in a hurry, go CHAD (Cheap and Dirty - Bunny). Cut a square piece of 2x4, locate the center and hot glue the casing to the block!

Be imaginative! Many items can readily be transformed into a display stand. If you have as many rockets as I do, consider using a bookshelf from a shelving unit. Arrange your models in a pleasing display, then mark the shelf. Nail, screw or glue spent engines in place. If you're careful about placement, fins won't overlap, and two or more models can be nested close to each other.

Birds like the Big Bertha are taller than single engine support due to their swept fins. Glue two casing together after the first is attached to the stand.

Rockets which look like jets present other problems. They look better displayed horizontally. Figure B and C show some solutions.

Figure B's stand is simple. The body tube support is just a split section of scrap tube that steadies the rocket. The wire hook can fit in a launch lug or around a fin to keep the rocket from sliding back.

Try the stand in Figure C if you want to get fancy. Get some plastic model airplane wheels and landing gear. glue them to a sheet of 1/2" plywood or 1/8" balsa. Attach some body tube supports to them.

Then paint the base like a runway, with runway numbers, lights, etc. Stand back and enjoy the oh's and ah's for both your model and display stand.

Figure A

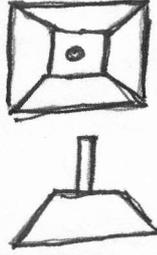


Figure B

For those "horizontal" jobs!

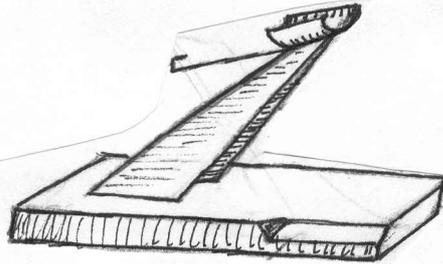
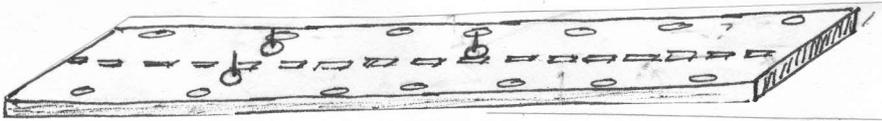
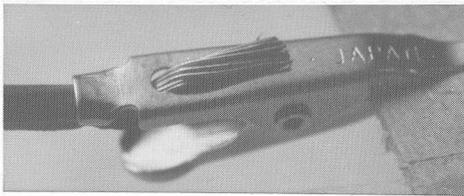


Figure C

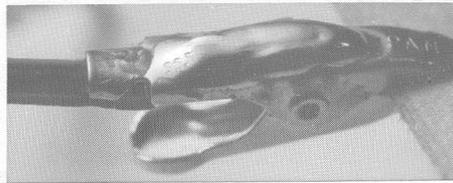


Mark as for runway; paint lights on sides.

Model airplane landing gear glued into place.



The photo shows what I found to be the best way to attach micro clips. The wire is soldered to the bottom side of the clip. On the top of the clip, at the wire location, are two small metal tabs. These are bent over the insulation using pliers. This acts as a strain relief for longer life.



Speaking of clean launch equipment, keeping your micro-clips clean is so important that you should do it regularly and often. A small piece of folded sandpaper is a cheap and easy way to do this. A long lasting alternative is a auto ignition points file, about \$1.50 at auto parts stores.

Eventually, no matter how often you clean them, you'll have to replace the clips. Inexpensive replacements are available from electronics distributors. Radio Shack sells a pack of ten micro-clips for \$1.09, a much improved price over "two for \$.50"!

(Editor's Note: Bunny copied this useful article from the COMPUSERVE's "ModelNet" Bulletin Board. Thanks to Bunny and Fred for a really helpful article. - Jedi)

After some extensive testing, I have found a set of super glues (alphacyanoacrylates) that really do a job for 1/2A to C powered model rockets. You'll find different brands of super glues at your local hobby shop. Basically, they all come in three grades: thin, gap-filling, and thick. Some common brand names and grades include:

THIN: Zap, Hot Stuff, Jet

GAP FILLING: Zap A Gap, Super Jet, Hot Stuff Super T

THICK: Slo Zap, Slow Jet, Hot Stuff Special T.

ACCELERATORS: Zip Kicker, Hot Shot, Jet Set.

I used products made by Pacer Technology: ZAP CA, ZAP A GAP, SLO ZAP, ZIP KICKER and Z-7 DEBONDER.

ZAP CA is the most familiar kind of quick drying glue. Applied sparingly to parachute shroud line connections, it virtually eliminates recovery failures. I also use it on shock cord knots to prevent them from coming loose, or to make a quick fix if the rubber breaks. When assembling engine mounts, I use ZAP CA to "tack" pieces together once I am satisfied with their positioning. It has also been used to fix broken fins in the field.

ZAP CA's main disadvantages are drying too fast on items needing adjustment, e.g., fins, being very brittle, failing to bridge

SUPER GLUES FOR MODEL ROCKETRY

by Fred Fischer
COMPUSERVE ID# 70655,404

gaps in joints, and bad adhesion when applied in quantity to porous wood and paper. It sounds

contradictory, but I must point out that ZAP CA does have its uses in limited areas and circumstances.

SLO ZAP is better suited for many jobs in assembly. It takes 2 to 5 minutes for SLO ZAP to set. You have time to position each piece precisely. I use it for launch lug placement, building engine mounts, assembly of nose cones and scale fixtures, and making permanent repairs "back at the base". SLO ZAP is a little thicker in density and adheres well to porous materials.

ZAP A GAP helps do the big jobs of reinforcement. On fins and lugs, I use it instead of white glue fillets. On engine mounts, I use it as the primary glue for assembly and reinforcement on tubes and centering rings. Wherever a space needs to be filled, ZAP A GAP fills the bill. I have even used it to fill gaps and scratches in plastic for smoother finishes. However, it is difficult to sand and requires a good deal of effort to polish it properly on plastic.

I noticed that once I have achieved a good fit with SLO ZAP or ZAP A GAP, I sometimes bump the pieces out of alignment. ZIP KICKER is a curing accelerator for all of these glues. It comes in a pump spray bottle for easy application. A light mist on the joint will cause instant curing of the quick glues. It's a real time saver when you are working to finish a model on a deadline!

Z-7 DEBONDER removes dried quick glues from work surfaces and your skin. If you don't like the work you just did or you accidentally attach yourself to the model, this stuff will save the day.

Another advantage of using these glues is their light weight. I built two Estes Alpha III kits, one using aliphatic glue and the other using all of the aforementioned glues. The quick glue rocket ended up after painting about 1/2 oz. lighter than the conventionally built rocket. It translated into flights that were on the average about 10% higher in altitude using simultaneous launches and engines from the same package. It may not seem like much, but for contests, that can be a winning edge.

WARNING ABOUT ALL OF THESE GLUES!!! They can cause eye irritation and can bond body tissue in seconds. Don't ever open a bottle of these glues while looking down the spout! If you should get glue on or around your eyes, do not use the Z-7 but instead flush the area with water and seek medical attention. (I always wear goggles when I use these glues. - Bunny) If you should glue your fingers together, the Z-7 will break down the glue. In any case be sure to wash your hands when done using these glues.

These quick glue products can be bought at hobby stores, predominately in radio control hobby shops. I hope this study and tutorial is informative and useful for all small scale model rocketry. I hope to do testing on D to F engine kits next year. Please address your comments and suggestions to me via Compuserve's EASYPLEX Electronic Mail.