

SR AcroPro[™] Instruction Manual © 2002

You're in for a real treat. Like the X250 and the Cutie before it, the AcroPro is fun to build and it flies great. With the suggested power system it's fully aerobatic and will even do vertical and horizontal eights. It's just a blast to hotdog around the sky and with its fully steerable tailwheel, it's just as much fun on the ground. This is an airplane that you're going to fly for a long, long time.

***No kidding!
Please read
this!***

We know you've been told a million times to read the instructions, but this time you really should. The AcroPro employs brand new construction techniques that you probably haven't run into before. Nothing about building the AcroPro is difficult, but much of it will be new to you. If you do mess up, give us a call. We promise not to holler at you. But, why not do it right the first time and follow the instructions? You'll save a lot of time if you do.

That having been said, we know the more experienced builders are going to ignore us, so let's make a deal. Most of the time, reading the heading and look-



ing at the photo is all you'll have to do to figure out what's going on. If there's something about a particular step that's critical or unusual, we'll mark that step with the exclamation point symbol. Anytime you see it, please read the text for that step.



We used thin, fast setting, CA glue in assembling all of the AcroPro prototypes. If we recommend a different glue for a particular step, we'll mention it in the notes.

Just about any radio system can be used. We've specifically set up the AcroPro for the

very fast and powerful MPI MX50HP ball bearing servos. These servos will work with any brand of radio and we strongly recommend them. If you can't find them locally, we always keep them in stock at SR. In fact, we stock everything for the AcroPro from the covering materials to the tools that will make it easier and quicker to build your AcroPro.

It's time to get going so grab your glue, turn the page, and let's get building!

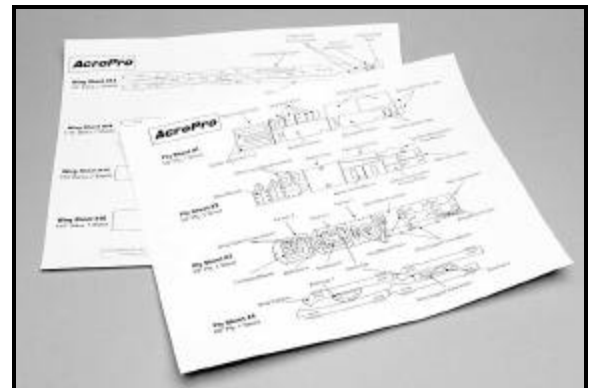
Power Systems...

Literally hundreds of hours of computer time were spent optimizing the AcroPro design. We didn't just design an aircraft, we designed an entire *system*. Although you can experiment and come up with your own system, we're sure you'll be more than happy with the components we've included in the AcroPro's optional Power System. It consists of the Jeti Phasor 15/4 motor with the corresponding Jeti JES 30-3P speed control, a Graupner CAM 9x6 prop, and an SR 1300 Max or 1500 Max 7 cell battery pack. We have a special *package price* for AcroPro builders for a complete power system so check with us if you have any questions.



Finding the parts...

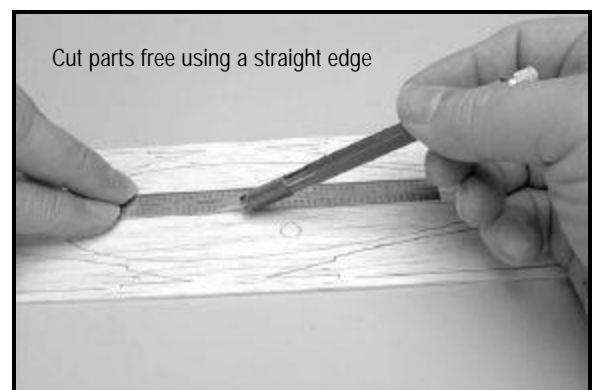
We've included master parts sheets that identify each part in the AcroPro kit. They will make it a lot easier to find the parts. In these instructions we'll tell you on which sheet a particular part is located.



Cutting the parts free...

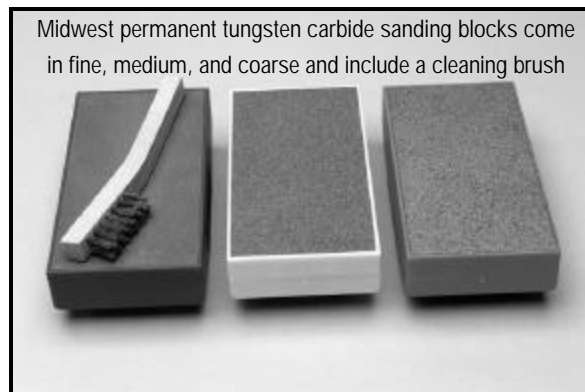
We've deliberately left all of the MicroLaser Cut parts for the AcroPro in their sheets to protect them. Use your modeler's knife and a straight edge to cut the small tabs that hold the parts in place. To make it easier for you, just about all of the cuts will be with the grain and you'll notice that the tabs are usually in a line from top to bottom across the 3" width of the sheet.

Although you can cut out all of the parts before you begin, we suggest that you leave them in their sheets until you're ready for them. It's up to you, but you'll be less likely to lose a part or have trouble identifying it if you leave it in its sheet until you're ready for it. Variations in the density of the wood will sometimes cause parts to not quite be cut all the way through. If you find any of the parts aren't cut all the way, just complete the cut on the back of the sheet.



Sanding...

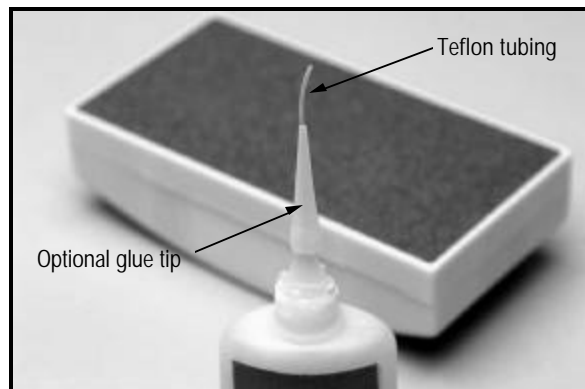
In most cases, the SR MicroLaser Cut process leaves the balsa parts with a honey colored edge that needs no sanding. Unfortunately, the glues used in making plywood tend to glaze the edges of the plywood parts when they are laser cut. We use a special plywood that is designed for laser cutting, but we recommend that all plywood parts be lightly sanded along their edges before gluing the parts in place. In addition, like spruce, plywood parts tend to have an oily film on their surfaces which prevents CA glues from taking a good hold. For this reason, we recommend that all plywood parts be given a light sanding on all surfaces before you glue them in place. We strongly recommend the Midwest permanent, tungsten carbide, sanding blocks which come in fine, medium, and coarse grits and even include a brass cleaning brush. We stock them at SR if your hobby shop doesn't have them. They'll make building your AcroPro a lot easier and faster.




Controlling thin CA glue...

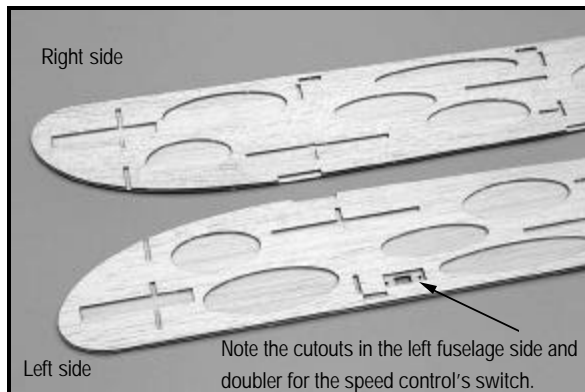
As stated earlier, thin CA glue can be used for just about every step in building your AcroPro kit. However, thin CA glue can be hard to control straight out of the bottle. You'll make life a lot easier if you buy some of the glue tips that are available and then add a piece of Teflon tubing to make it even easier to control the flow of the glue.

To keep from gluing the parts to your building board, remember to use a piece of waxed paper under your work. To keep from gluing the parts to your fingers... Well, I haven't figured that one out yet.



Warning, Warning, Warning!!!

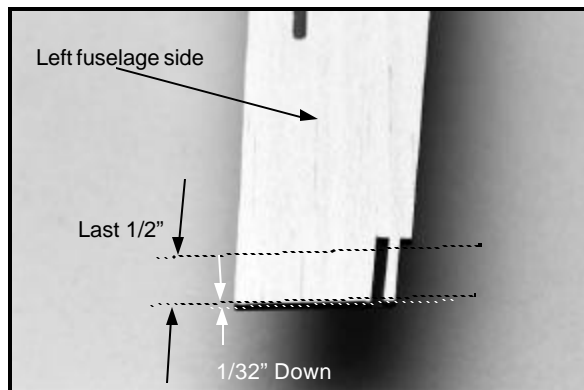
 This is the single most important step in building your AcroPro. The entire trueness of the fuselage depends on you properly aligning the fuselage doublers to the sides of the fuselage before you glue them to each other. Take your time and don't rush this step even though it may seem very simple. **DON'T MAKE TWO LEFT OR TWO RIGHT FUSELAGE SIDES!!!** There is an easy way to identify the lefts from the rights. The left fuselage side and left doubler have cutouts for the speed control's switch! **Don't lose the four little triangles in the center of the doubler sheet.**



Chamfering the fuselage sides at the tail...

! Before you start work on the doublers, you'll have to chamfer the rear inside edges of the fuselage sides so that when the fuselage sides are finally joined at the tail, the resulting fuselage width will be 1/8". To do this, you'll only have to remove 1/32" of balsa in the last 1/2" of each fuselage side so that it ends up being 1/16" thick. ***Make sure you've identified the right and left fuselage sides properly so that you're sanding their inside edges and not their outside edges!!!*** An easy way to make sure you don't sand past the 1/2" line is to lay a piece of masking tape along the line and then sand up to the tape.

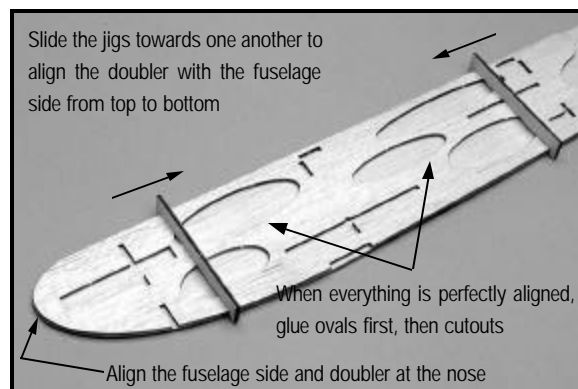
An easy way to know when you're down to a thickness of 1/16" is to use a scrap piece of 1/16" balsa as a feeler gauge. Keep comparing the thickness of the aft edge of the fuselage with the 1/16" scrap. When they are the same thickness, you're done.



Aligning the fuselage doublers...

! Now, for the fuselage doublers. ***Be careful, there's a right and a left! The left doubler has the cutout for the speed control's switch.*** To help you align the doubler with the fuselage side, we've included two "C" shaped plywood alignment fixtures.

First, use your eye and finger tips to align the two at the nose. Then, slide on the front fixture from the nose and slide it rearward. Then position the rear fixture and slide it forward. The fixtures will only slide so far and then they will stop because the fuselage side and doubler become larger in width than the cutout in the fixture. When the fixtures can't be slid any further towards one another, they will have automatically put the doubler and fuselage side in perfect alignment with one another from top to bottom. The only thing you'll have to do is check to see that the two are still flush with one another at the nose. If the two noses aren't perfectly lined up with one another, loosen the two fixtures, realign the two at their noses and then slide the fixtures back on to realign the fuselage side and doubler from top to bottom.

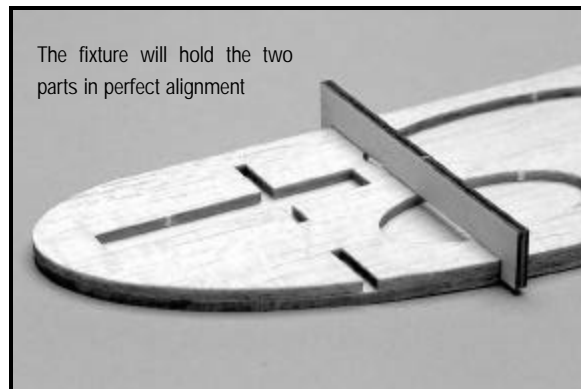


(See parts sheet #1)

Gluing the fuselage doublers in place...

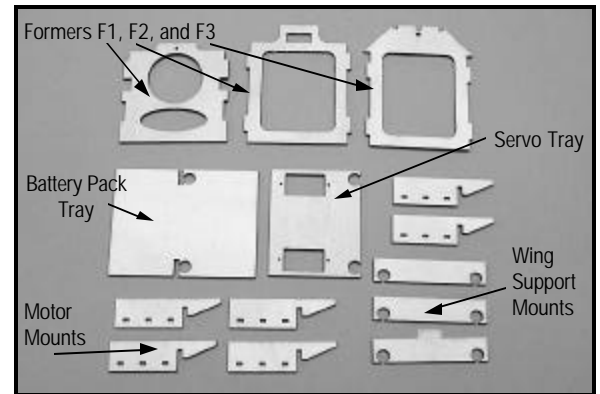
When you're satisfied with the alignment of the fuselage side and doubler, glue them together with **thin** CA glue. First, put a drop of glue every 1/2" or so around the perimeter of the oval cutouts in the doubler. Then, put a drop of glue every 1/2" or so around the rest of the cutouts, but don't get carried away with the glue. When you insert the formers and other parts into these cutouts you'll be gluing them again so you don't need to get crazy with the glue at this stage.

When you're done, run a bead of glue around the edge of the doubler where it meets the fuselage side. Do the same for the other doubler and fuselage side and **DON'T MAKE TWO LEFT SIDES!!!**




Find the parts...

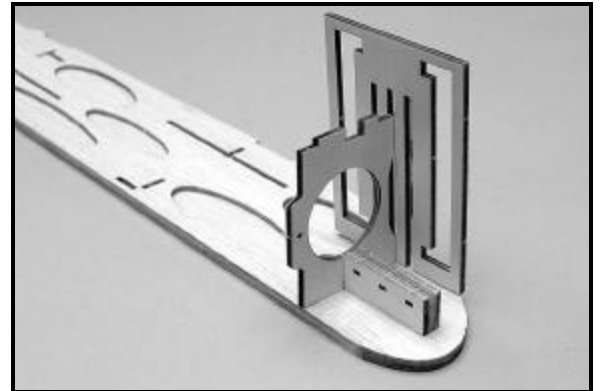
The photo at the right illustrates the parts you'll need for the next steps so remove them from their sheets and give them a light sanding. Trial fit your servos in the servo mounting tray and make any necessary adjustments. The stock cutouts have been sized for MPI MX50HP servos. Use a piece of wire to pop out any holes after first cutting them free and trial fit the wing support tubes in the wing support mounting plates. If you do the same with the servo tray, you'll find that the holes are deliberately oversize so don't panic.



(See parts sheets #1, #2, and #3)

Trial fit the right motor mount and firewall...

 Each motor mount is made up of three pieces of plywood. The top and bottom pieces should have the grain running the short way across the motor mounting plate and the center piece should have its grain running the long way down the plate. Trial fit, *but don't glue*, the three right motor mounting plates and firewall into the right doubler. You'll probably find that they are a snug fit, but a little light sanding will fix that.



Adjust the fit of the parts...

Use just a few gentle swipes of your sanding block at a very shallow angle on the edges of the parts where they are inserted into the doubler to make them fit more easily. We are not talking about a lot of sanding here. A few gentle swipes is all it will take. The parts shouldn't be loose, but they shouldn't be tight either.

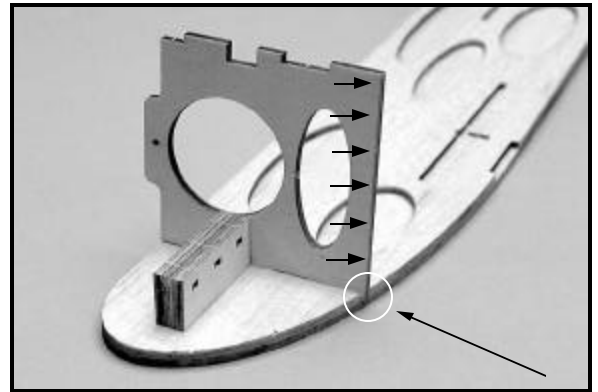
Don't forget to do both edges because it will be more difficult to sand these parts after one side has been glued in place.



Chamfer the bottom forward edge of the firewall...



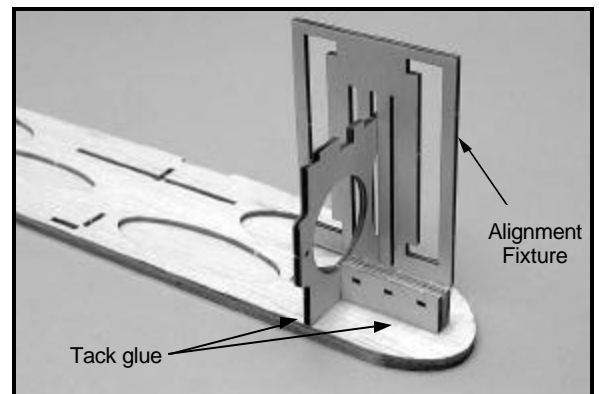
If you look closely, you'll see that the forward, bottom edge of the firewall needs to be sanded back at an angle because it overlaps the fuselage side. Use your sanding block at an angle and remove the small amount of overlapping material so that it won't interfere with the bottom sheeting when it's glued in place.



Use the alignment jig...

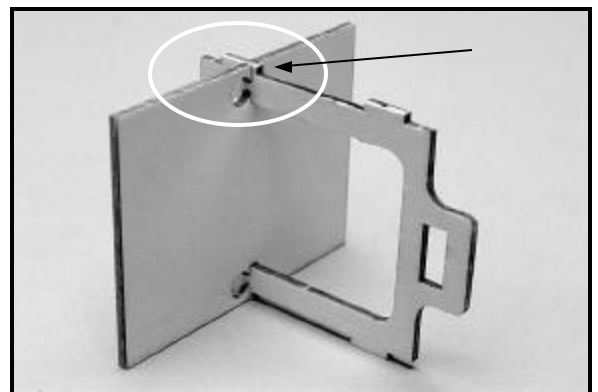
We've given you a plywood alignment fixture to keep everything aligned properly. The fixture has three slots. The center slot is used with plywood parts. The largest slot is for aligning the vertical stabilizer after it's covered and the narrowest slot is used with 3/32" parts. The outer corners of the fixture are cut at exactly 90° which will come in handy later.

With the firewall and motor mount firmly seated in their recesses in the doubler, use the alignment fixture to make sure the firewall is square with the doubler. ***Don't glue anything!*** You'll glue the fuselage components together later after you've determined that everything is in perfect alignment. We'll tell you when to glue!



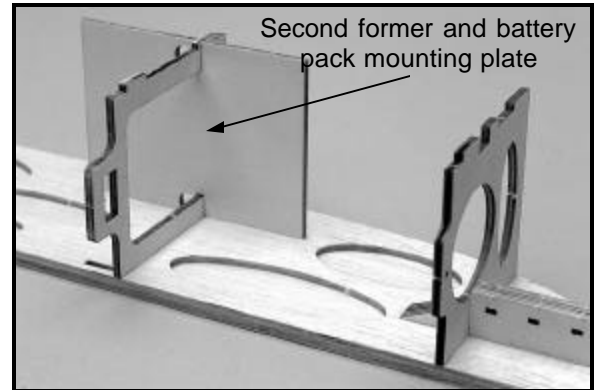
Battery pack mounting plate...

Before you install the second former, you'll first insert the battery pack mounting plate through the hole in the center of the former and rotate it into place. Slide the mounting plate down so that it's positioned slightly below the top of the tab in the side of the former. Trial fit it into the fuselage side to make sure the positioning of both parts is perfect.



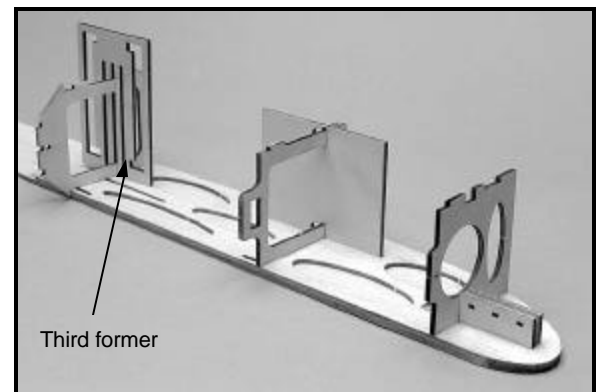
Second former...

Check the fit of the second former and battery mounting plate. Again, use your sanding block to make sure you have a smooth fit that isn't snug or tight. Don't glue anything!




Third former...

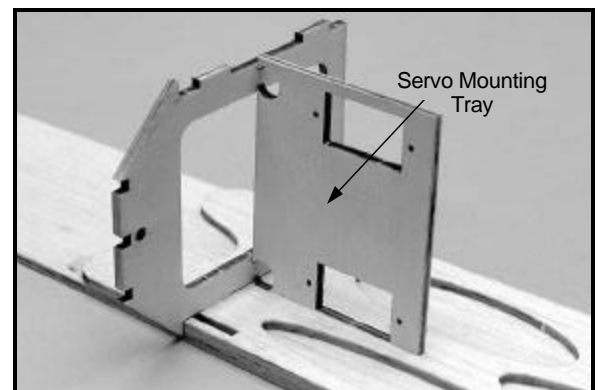
Repeat the above step with the third former making sure it isn't snug or tight. Don't glue anything!



Servo mounting tray...

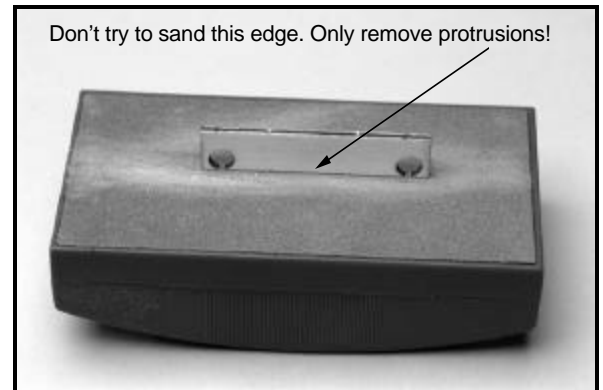
 Now is the time to trial fit your servos into the servo mounting tray. We've already sized the plate for the MPI MX50HP servo that we highly recommend for the AcroPro, but it will be easy for you to adjust the tray for other brands of servos. We've left plenty of extra material in the plate so just open up the hole until it fits the servos you're going to use.

Dry fit and adjust the tray as necessary, but ***Don't Glue It In Place*** yet.




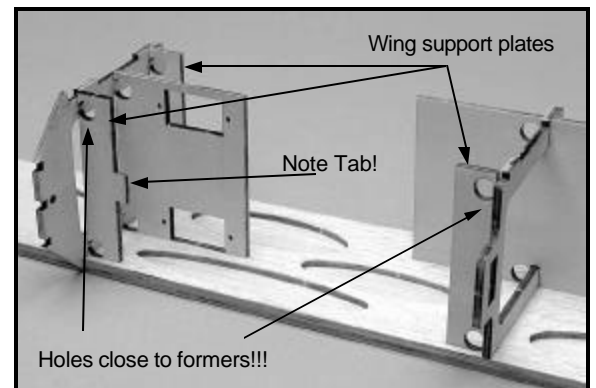
Prepare the support plates...

The edge of the three wing support plates will probably have some small protrusions where the tabs were left to keep the parts from falling out of the plywood sheets. Take a few swipes with your sanding block on the edge closest to the holes. ***Only move the piece in one direction rather than back and forth as it will give you a straighter edge.*** Don't try to remove any material from this edge. You'll only be trying to knock off any protrusions that would prevent the plates from resting properly against the formers.



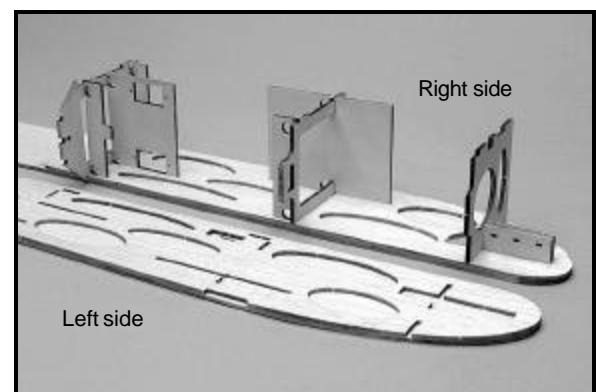
Insert the support plates...

 The three wing support plates should be dry fit and adjusted as necessary. *Notice that the upper rear support plate has a "tab" protruding forward! Don't glue them in place! Also, notice that the holes are positioned closest to their respective formers!*



The right side is done...

Here's what the right fuselage side should look like at this point. The right motor mount, firewall, battery pack mounting plate and servo tray are in place.

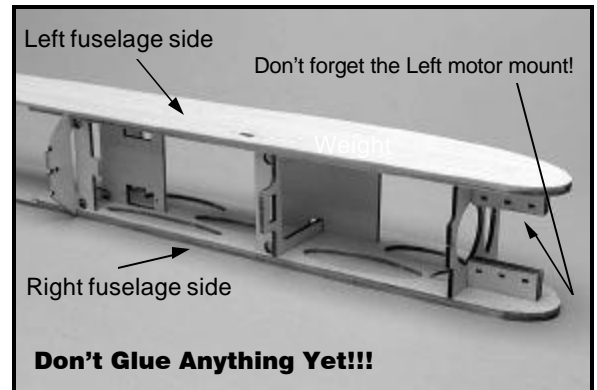


Trial fit the left fuselage side...



Following these instructions will assure a straight and true fuselage without any twists.

Dry!!! fit the left fuselage side. Before you do, insert the *left motor mounting plates into the left fuselage side*. Then, starting at the nose, slip the firewall, battery pack support plate, second former, wing support plates, servo tray, and third former into their corresponding recesses in the left side doubler. Take your time. Make sure that the parts are firmly seated in their recesses and that nothing is preventing them from completely seating.

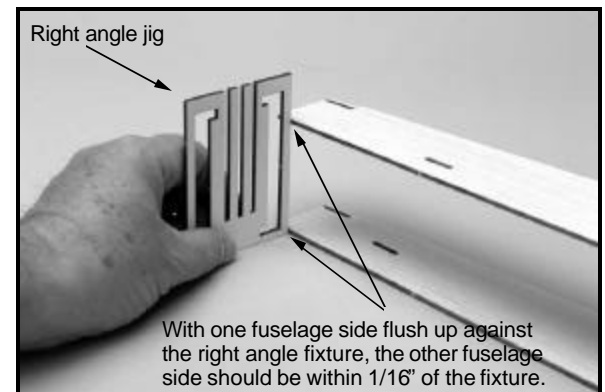


Check fuselage alignment...



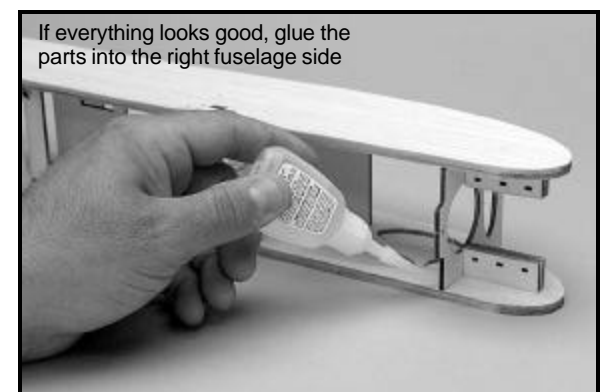
Before gluing any parts together, use the right angle fixture to check how closely the two fuselage sides line up at the tail. Put the fixture flat on the building surface and see how close each of the fuselage sides comes to the fixture.

If you were careful about lining up the doublers with the fuselage sides and all of the formers were firmly seated in their recesses, the fuselage sides should line up very closely with one another.



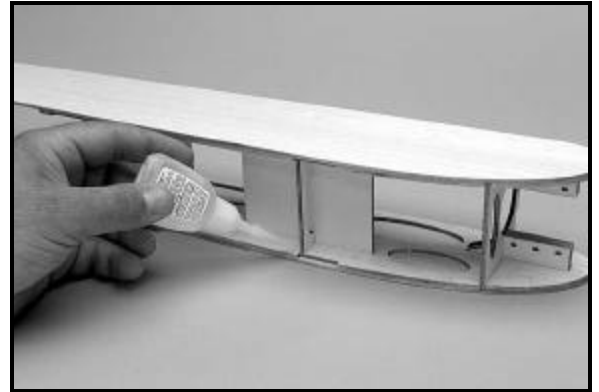
Glue the parts into the right fuselage side...

OK, now you can use some glue! If the fuselage sides are close to being square (within an $1/16$ " or so), go ahead and tack glue some of the parts into the right fuselage side and then check the alignment again. If the two are way off ($1/8$ " or more), try to sand and adjust the ends of the parts and the recesses in the doubler until you can align the two fuselage sides with one another. If everything still looks good, go ahead and glue the parts into the right fuselage side. This is an important step so make sure you get it right.




Attach the left fuselage side...

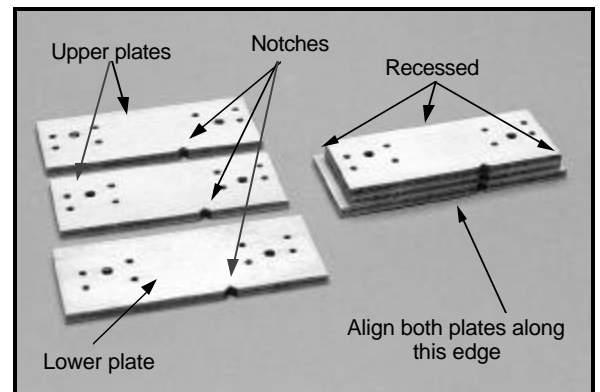
Carefully turn the fuselage over. Make sure all of the parts are still positioned properly and weight the fuselage down if necessary. Check the alignment at the tail again with the right angle guide and if everything looks good, go ahead and glue all of the parts into the left fuselage side.



Assemble the landing gear mounting plates...

 The first step in assembling the gear mounting plates is to glue the two upper plates to the lower plate. You'll find that the upper plates are smaller.

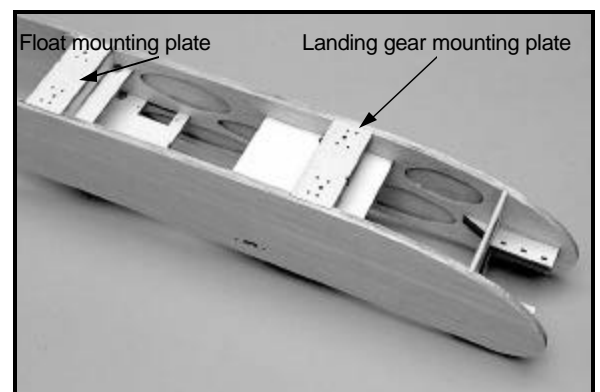
To make it easier for you to align the three plates over one another, we've cut a small notch in edge of each plate. If you line these notches up with one another, you'll find that the holes in the plates are automatically lined up. The edge of the plates with the notch should be flush with one another. When aligned properly, there will be a recess formed on the other three sides of the assembled mounting plate. Carefully align the upper and lower plates with one another and glue them together.



(See parts sheets #2 and #3)

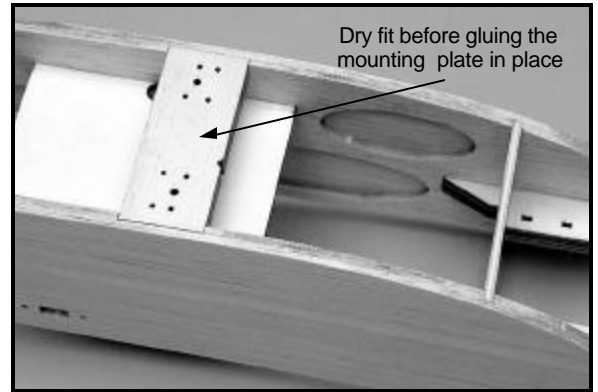
Gear mounting plates...

You'll find that there are two recesses in the bottom of the fuselage doublers for landing gear mounting plates. The forward set is used for the landing gear and the rearward set is an attachment point for floats if you ever choose to fly your AcroPro off of the water. Even if you think you'll never use floats, install the second mounting plate anyway.



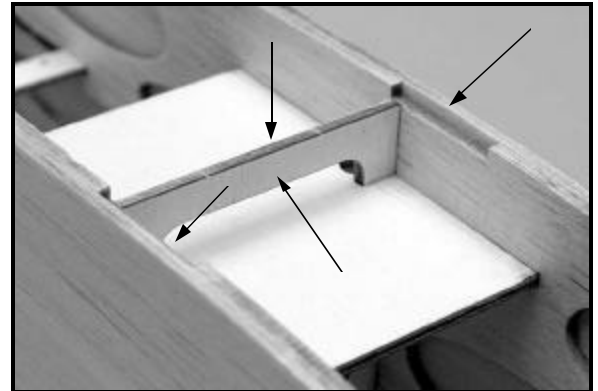
Dry fit the gear plates...

The next step is probably best done with slow CA glue or aliphatic resin glue. But, before you glue anything, dry fit the two plates in their recesses to see how they fit. They should just drop into place snugly.



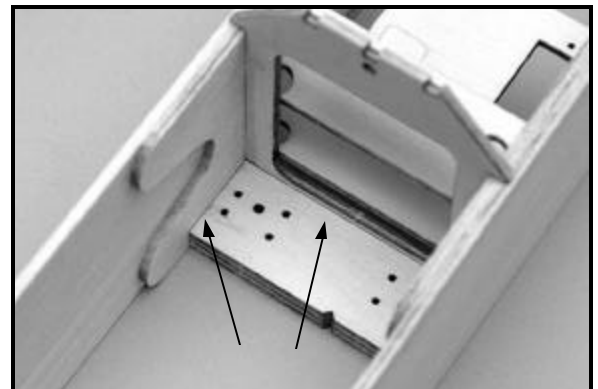
Glue the gear plates in place...

If you're happy with the fit, run a bead of glue along the two doubler recesses, the top of the former, and the face of the former. Press the mounting gear plate firmly in place and let the glue dry. Do this with both the front gear mounting plate and the rear float mounting plate.



Final gluing...

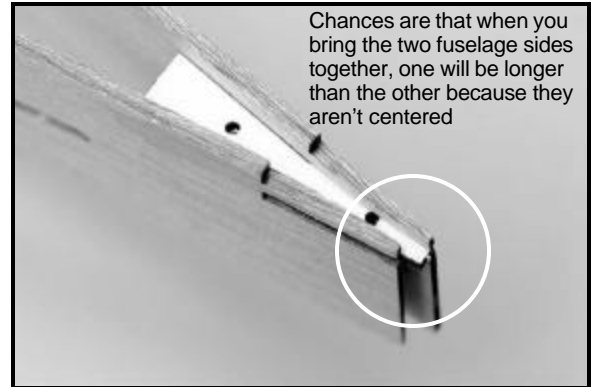
When the glue is dry, use thin CA glue along any edges of the two mounting plates that you can get at to make sure they are firmly locked into place.



Joining the fuselage sides at the tail...

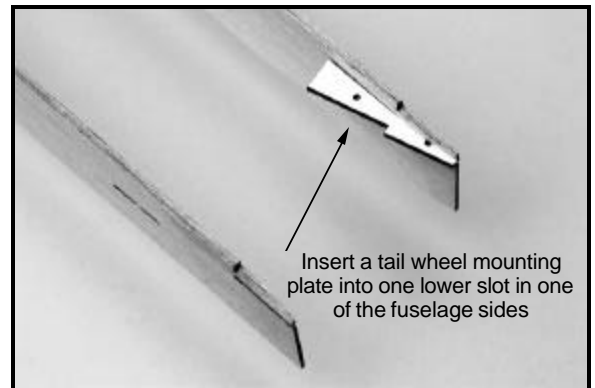
If you're lucky, the stiffness of your two fuselage sides will be exactly the same and if you join them at the tail, they come together centered. Forget about it. It isn't going to happen. Wood is wood and chances are the stiffness of the two sides will be different. No problem!

Before we start, I'm going to warn you that it's very easy to break loose the small piece of balsa that sticks out from each fuselage side at the tail. Try to be careful and don't bump this piece. If you do and it cracks loose, don't panic. Just line it back up and CA it back in place. I know it's easy to do because I've had to do it twice myself!



Tail wheel mounting plates...

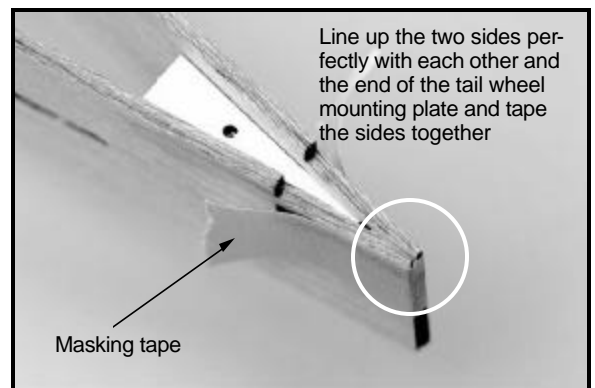
In the center of the third former located on the plywood parts sheet #3, you'll find three plywood pieces that look like arrow heads. They are the mounting plates for your tail wheel assembly. Two look like a barbed arrowhead and one looks like a regular point. The barbed ones are the top and bottom tail wheel mounting plates. The regular one fits between them. With your fuselage side turned upside down, insert one of the barbed plates into the lower notch in the fuselage side. Now, bring the two fuselage sides together at the tail and see how they meet. Chances are they'll look like the photograph above and one will be longer than the other because they aren't meeting in the center.



(See parts sheet #3)

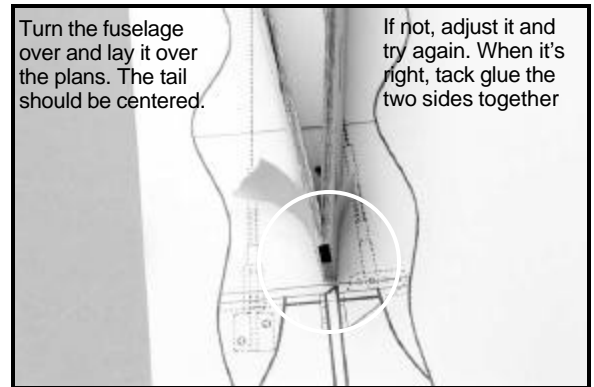
Centering the tail...

In order to be centered, the two fuselage sides must be exactly the same length and be flush with the end of the tail wheel mounting plate. Have a friend hold the fuselage down or use some weights so that it doesn't move. Move the tail left or right until the two ends line up with each other and the end of the mounting plate. When you think you have it right, wrap a piece of masking tape around the tail to hold everything in place.



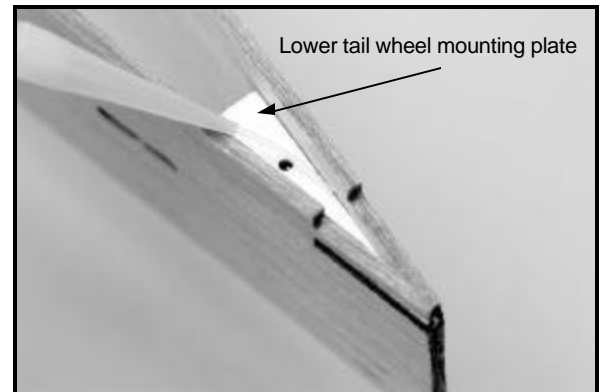
Double check the centering...

Now, turn the fuselage over, right side up, and lay it over the top view of the fuselage on the plans. Take your time to line the front of the fuselage up with the top view. Is your tail centered? It should lie directly over the center line shown on the plans. If not, adjust it and try again. Take your time as this is an important step. When you're happy with the result, tack glue the two fuselage sides together.




Glue the fuselage sides together...

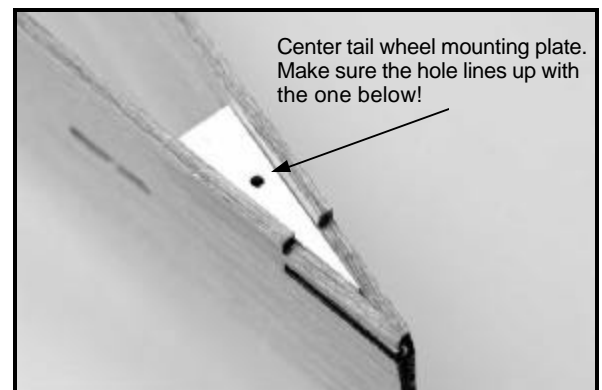
Now that the fuselage sides are centered and tack glued to each other, run a bead of thin CA glue around the edges of the barbed tail wheel mounting plate and down the joint where the two fuselage sides meet.



Insert the center tail wheel mounting plate...

 Lay the center tail wheel mounting plate (the one *without* the barb) on top of the first that you've already glued in place. This second plate simply sits between the two fuselage sides.

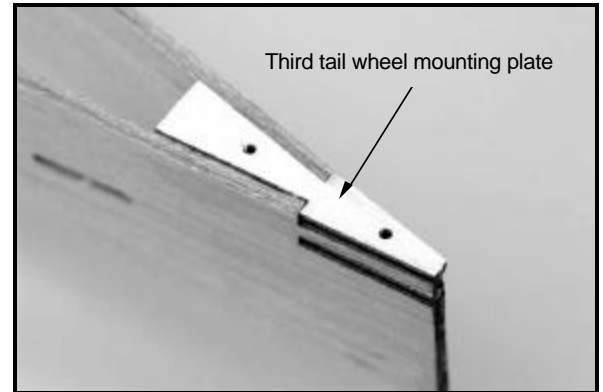
Look down through the hole in the center plate and see if it lines up with the first. Chances are that it won't and you'll have to sand the two edges of the plate until it can slide back enough towards the tail so that the two holes line up. When they do, glue the center plate in place over the first plate.



Glue the third plate in place...

You're almost done. Lay the top barbed plate in place and if everything lines up, it should, glue it in place over the previous two tail wheel mounting plates.

Finally, re-glue around the entire assembly including the joint at which the two balsa fuselage sides meet.



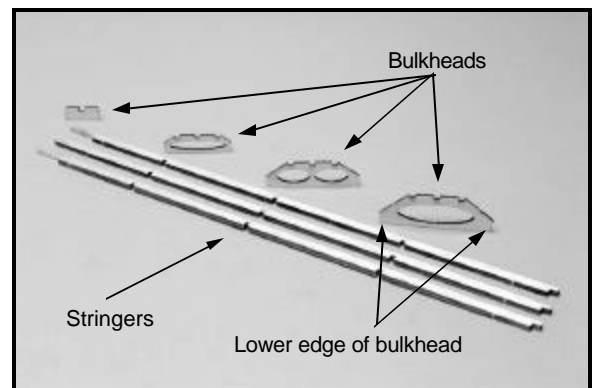
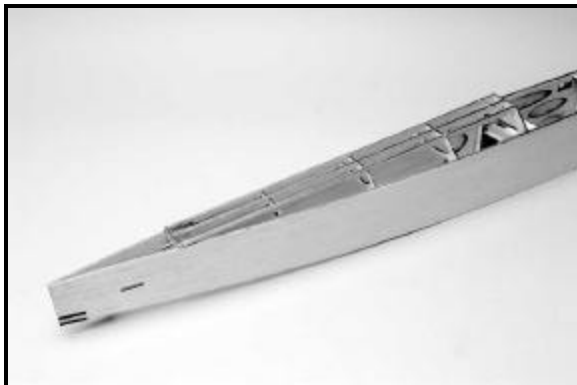
The basic AcroPro fuselage assembly...

At this point you've completed the basic assembly of your AcroPro's fuselage. Most of the tough parts that will determine how well your AcroPro will fly are behind you so pat yourself on your back and let's get the fuselage finished!



Assemble the top rear of the fuselage...

The top rear of the fuselage is constructed of three stringers and four bulkheads. Two of the stringers are different from the third, but we'll get to that in a moment.



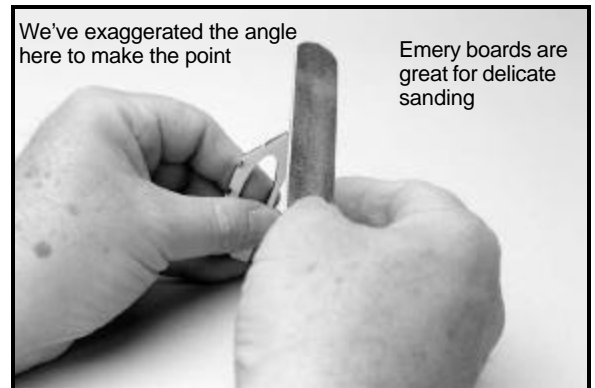
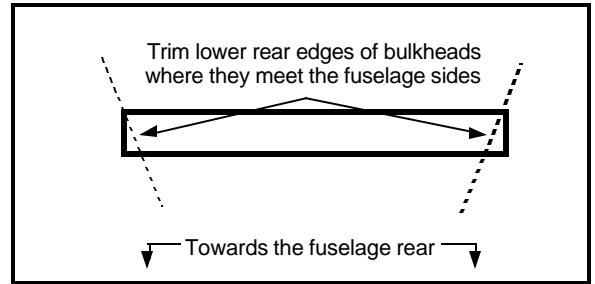
(See parts sheets #3, #4, and #11)

Taper the edges of the bulkheads...



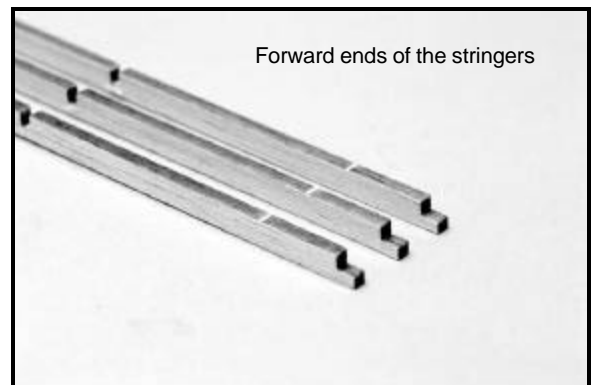
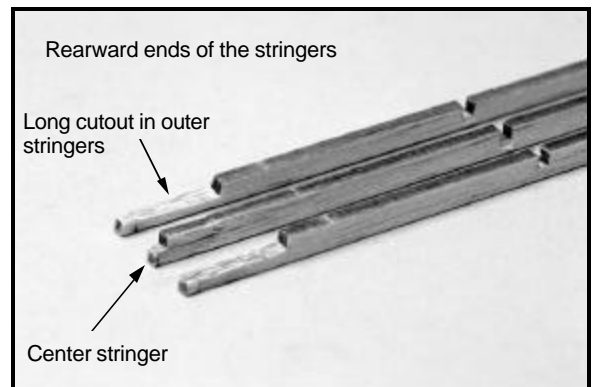
Because the fuselage tapers towards the rear, the rear edges of the bulkheads have to be trimmed slightly so that they make better contact with the fuselage sides. An emery board or a scrap of plywood with a piece of sandpaper glued to it is a great tool for this kind of delicate sanding.

Make sure you trim both edges of the bulkhead in the correct direction (Don't ask me how I know!). Don't make one going forward and one going rearward. Once you've decided which is the front and which is the rear of each bulkhead, put a pencil mark on the front side so that it will be easier to identify later on.



Identify the center stringer...

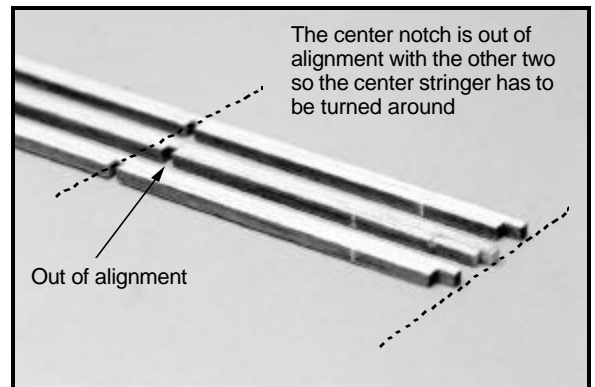
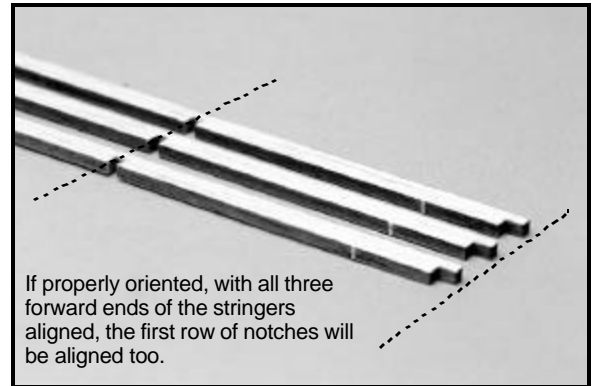
It's easy to pick out the center stringer. If you look at the ends of the stringers, you'll see that two of them have long cutouts in one end. Those are the outside stringers and the remaining one, with a short cutout at both of its ends, is the center stringer.



Identify the front and rear of the center stringer...

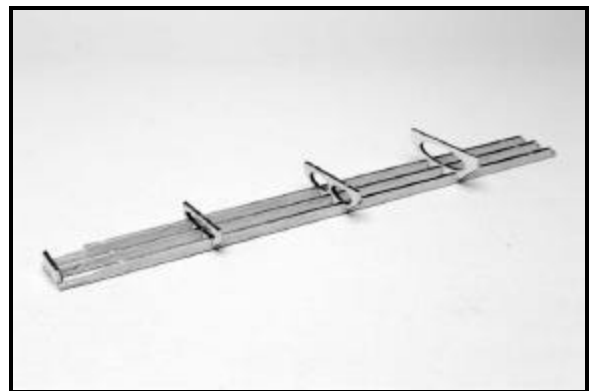
Trying to figure out which end of the center stringer goes towards the front and which end goes towards the rear is a little tougher. Lay the three stringers down so that they are flush with each other at one end and the center stringer is in the middle. Take a look at the first set of notches in the stringers. Are all three notches in line with one another, or is the notch in the center stringer out of alignment with the other two? If you have the three stringers oriented properly, all three notches will be lined up with each other.

Don't panic trying to get this right. In the next step, nothing will line up if you have it wrong and you'll know immediately that you have the center stringer turned the wrong way.



DON'T reach for the glue...

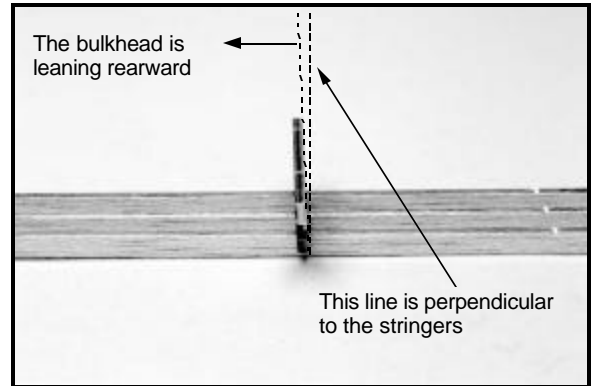
The next steps will be done dry, without glue, initially to make sure everything fits right. You won't glue everything together until the end.



The bulkheads aren't square to the stringers...



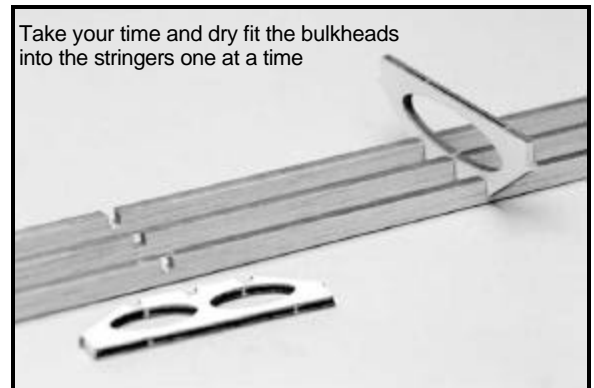
Before you insert the first bulkhead into the stringers, notice that it doesn't fit into the stringers at a 90 degree angle. Instead, it's angled back some. The bulkhead will end up being perpendicular to the fuselage, but it's not perpendicular to the stringers.



Insert the bulkheads one at a time...

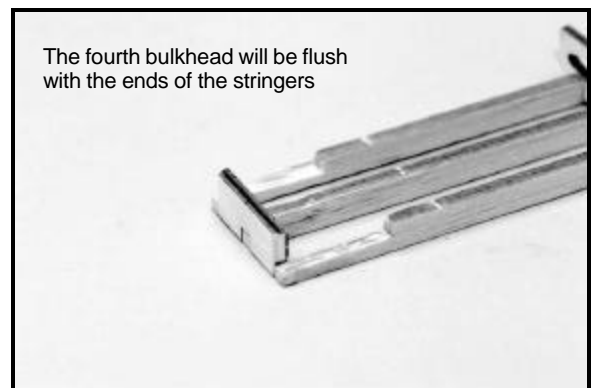
Gently insert the bulkhead into the notches in the stringers. You'll notice that the bulkhead won't go all the way down to the surface of your table. We don't want the bulkhead to show through your covering material so the bulkhead stops short of the surface of the stringers. Use the marks you made on the forward sides of the bulkheads as a guide to make sure the corners of the bulkheads that you trimmed away by sanding them back are all facing rearward.

Be gentle with the stringers and try not to crack them. No, this is one mistake I haven't made yet, but if you do crack one, just use some CA glue to fix it.



The final bulkhead...

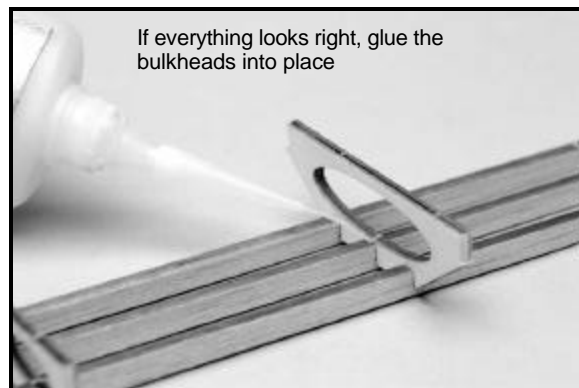
Take your time and work each of the four bulkheads into place. The fourth bulkhead, towards the tail, will end up being flush with the ends of the stringers.



Glue the bulkheads to the stringers...

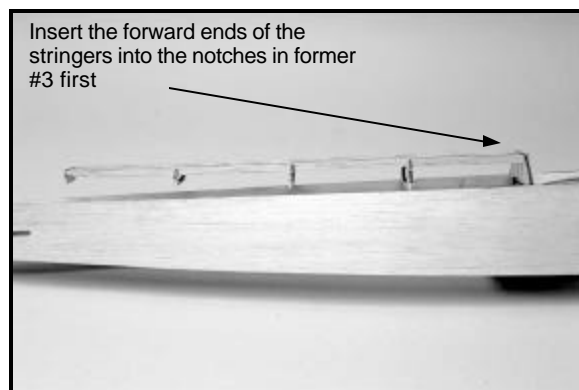


Double check the fit between the bulkheads and the stringers. Are the bulkheads fully inserted into the notches? ***Are all the tapers you sanded into the edges of the bulkheads facing towards the rear of the fuselage???*** If they are and everything is sitting nice and flat on your building board, use thin CA glue to glue all of the bulkheads to the stringers. You did remember to use waxed paper under your work so that it doesn't stick to the building board didn't you???



Install the stringer assembly...

While holding the rear of the stringer assembly up a little, slide the ends of the stringers into the notches in the top of the third fuselage former. Now, lower the stringer assembly at the rear and spread the fuselage sides a little as each bulkhead drops into place. Make sure that the stringers stay firmly seated in the notches in former #3.



The outer stringers rest on top of the fuselage sides...

Work your way to the rear and finally insert the fourth bulkhead between the fuselage sides. You'll find that the outer stringers will come to rest on top of the fuselage sides.

Take a good look at the assembly. Are all of the little stops at the outer corners of the bulkheads sitting firmly on the top of the fuselage sides? Are the stringers still fully seated in former #3? If so, you can go ahead and glue everything into place.

