Building a Better Profile

Part 2 - Fuselage Wood Selection

Al Rabe's irresistible "Bearcat"

Why Build a Profile?

The sight of a big, gorgeous, finely crafted stunter flown by a master has inspired many a person to want to build a model airplane. And what kind of model would they like to try first? Why, "Just like THAT one, of course!"

But newcomers seldom realize the time and effort required to produce such a model. The superb building and flying skills so casually displayed by an expert are acquired over years in the hobby. And we can be certain that very little "learning" transpired on the current beauty: its finish alone may have required hundreds of hours.

So, it is fair to assume that not just anyone who falls off a pumpkin wagon can automatically build and fly a model airplane! On the other hand, there is no waiting period on the fun. And desire and persistence are soon rewarded. Let us not forget that every master was once a rank beginner, embarking on his first model construction project.

Almost surely, that model was a **profile** ship. To this day, profiles remain the humble workhorses of control line modeling. They are still the practical, logical choice for the serious beginner.

"Liberty", profile Mo'Best by author

With a little bit of thought and effort, we can build profile ships with quality engine run and flight characteristics that are competitive with full fuselage stunters.

The Profile Fuselage

The fuselage is both the blessing and curse of a profile ship. Advantages of the profile fuselage include simplicity, good access to engine, fuel, and control systems, as well as ruggedness and (perhaps most importantly) **repairability**. Crashes which would spell certain and final death for a built-up ship are frequently repairable on a profile.

In terms of ultimate beauty the profile ship invariably suffers, of course. Other profile disadvantages may include weight, lack of torsional rigidity, gear mounting problems, vibration and engine run complaints. Herein I intend to convince you, by example, that good design and construction overcomes most of those complaints, to yield very competitive profile models.

Finding Fuselage Wood

Since the fuselage is typically a large percentage of the wood mass on a profile ship, ideally a flat, straight piece of "punk" (soft, light, clear) balsa is needed for it. With decent 4" wide 1/2" sheet often hard to find, consider splicing narrower 1/2" sheets lengthwise to meet your requirements.

With proper construction, soft wood works well because the bulk of important strength (in the profile nose) is gained through plywood doublers and engine mounting blocks.

Watery thin CA glue penetrates soft wood instantly to produce a strong, invisible splice joint, provided you have a **tight fit**. If you don't already have one, invest in a 24-inch T-bar for sanding splice joints. Nothing else does quite as well.

Avoid butt joints in splicing fuselage pieces. When it is absolutely necessary to join pieces in this manner (e.g. for "Fancherizing" a ship by extending the tail moment), a much stronger splice results when the pieces are cut at an angle to the grain. Use epoxy glue, or (with tight fits), thin CA is again a glue of choice.

"Justice" Mo'Best profile, sister ship to "Liberty"

Try to consider the kind of stress that splice joints will actually see. For example, a "canopy" block typically supports only its own weight and does not contribute much to structural integrity of the fuselage

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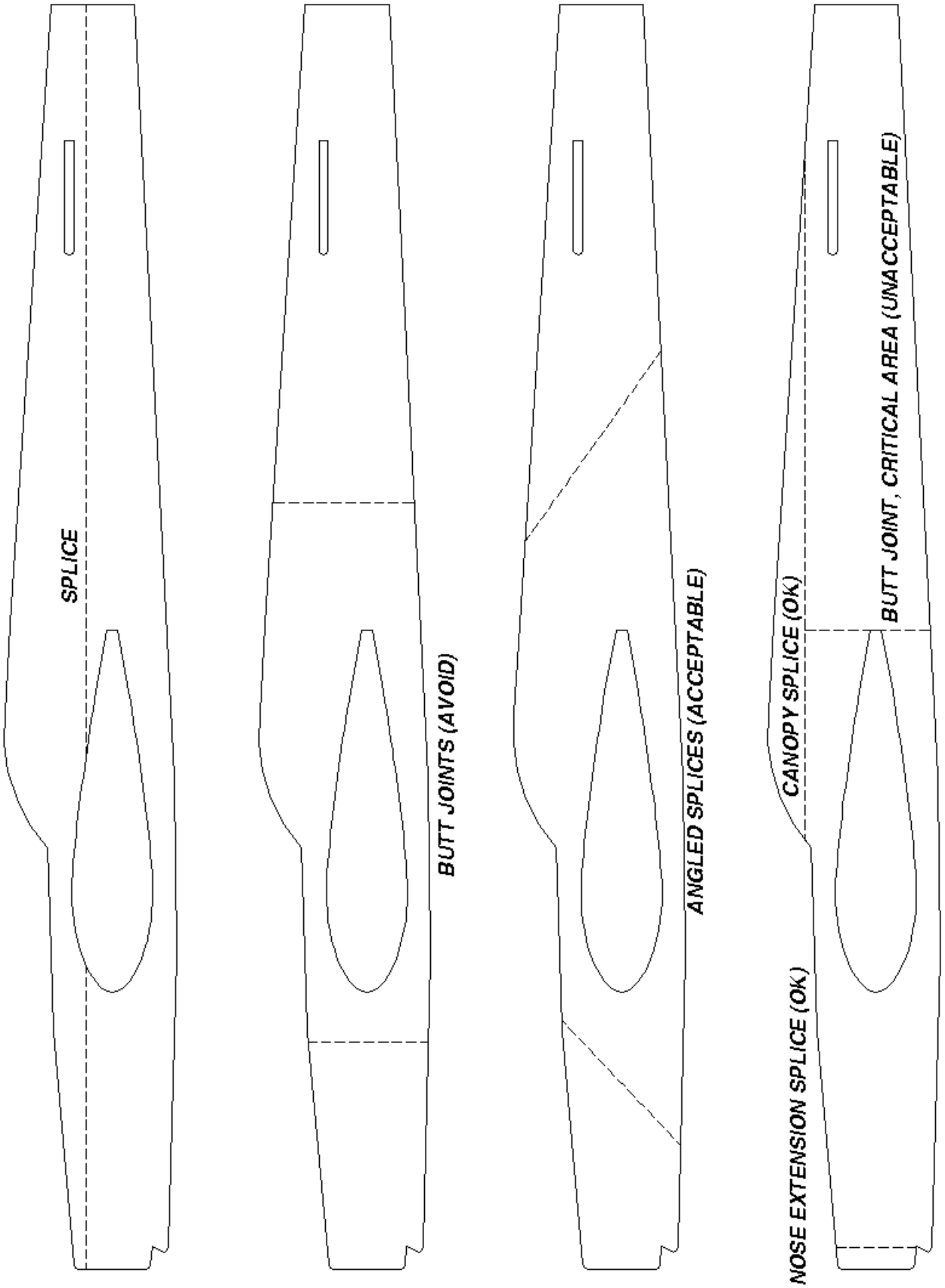

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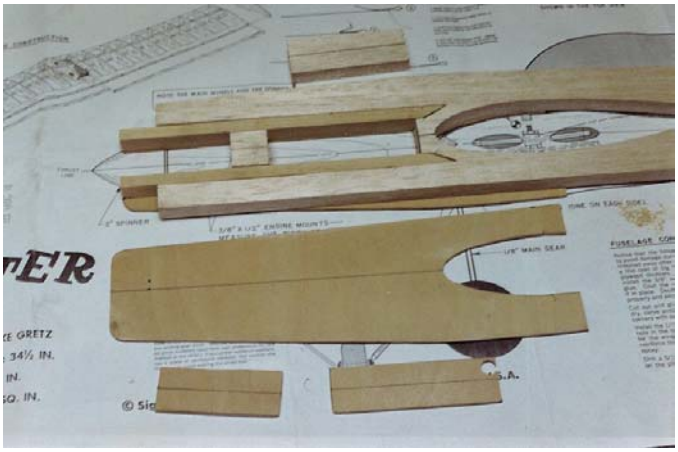
The same might also be said of smaller filler blocks to extend the tip of the nose. On the other hand, the area directly behind the wing is a terrible spot to have a major splice!

Cut Off HEAVY Ends!

Measure the center point of each sheet and try balancing it there. Mark the **heavy** end of each sheet - arrange to cut excess length off this end and remember to position that end toward the NOSE. Check both sides for flatness and try to position the flatter side on the RIGHT side of the fuselage (more about this later).

Engine Mounts

For engine mounts, 1/2" x 3/8" hard maple stock should be used. Buy two 12" long pieces, so you can extend the engine mounts all the way back to the leading edge of the wing. Basswood, sometimes found in profile kits, is much weaker than maple and a poor choice for engine mounts. 1/2" x 1/2" maple stock is normally used for .60-sized engines, and is usually not appropriate for profile engine mounts.



Modified Twister nose with extended engine mounts, recessed fuel tank cutout and birch plywood doubler

Fuselage Doublers

For fuselage doublers, 1/8" hard [SIG] aircraft birch plywood is recommended. While Lite Ply is soft, light, and easily cut and sanded, it is a poor choice for profile fuselage doublers. Save your Lite Ply for weight tip boxes, adjustable leadouts, and fuel tank shim pieces!

Even 3/32" birch plywood is markedly stronger than Lite Ply. Typically, two profile doublers can be cut from a 6" x 12" piece of birch plywood, with enough material to extend the doublers back past the high point (typically the spar) of the wing.

Don't be concerned by the small additional weight of long engine mounts and nose doublers of quality materials. Your efforts will be rewarded with a superior profile ship with minimal vibration, and a smooth engine run. Additional weight on the nose is less critical and often makes the ship more stable and easier to fly anyway.

Reference Lines

Get into the habit of drawing accurate reference lines directly on your wood stock. Use a fine point felt tip pen to avoid denting soft balsa. Light sanding will remove the lines later if required.

Virtually all stunt ships want engine and wing and stabilizer incidence as parallel as possible to each other and some reference line. Those lines can be drawn with incredible ease and accuracy BEFORE assembly. Afterwards, well, good luck!

Drawing fuselage reference thrust line

When building a kit you may be tempted to forget about drawing reference lines. Let us not be foolish! Even accurate stamping tools will not overcome the tendency of balsa to warp and twist as it cures. If the lines you draw confirm their accuracy, won't you feel good? On the other hand, if they reveal a bad warp or twist you can correct before you start, won't you feel even better?

Profile Twister by Lewis Cunningham

-Larry Cunningham