



DIRTY DAN'S "DIRTY BEAVER"

By DAN RUTHERFORD . . . Originally meant to be a "tuner upper" for the hot-shot combat flier, this model fits right in to a new event that is rapidly gaining popularity . . . Half-A Combat!

• Although .049 Combat planes have, as a rule, been completely ignored by most serious Combat fliers, I would hope that anybody interested in Combat will build and fly a Dirty Beaver.

The DB is in no way related to what you would consider to be just another .049 Combat plane. The plans and pics show the obvious; the plane is very light, plus being cheap and quick to build. What is not so obvious is the fact that a DB can be punched into the ground without much (if any) damage. Even if the DB is broken, it is easy to fix, as all of the structure is readily accessible. Center section sheeting turns out to be a pain to install, and just makes repair of the bent plane more difficult.

Also not too obvious is the flying abilities of the DB. The plane will turn very tightly and quickly. Consecutive loops are super, quick, and successive reversals of direction are also super. "Wiggles" are the planes strong point, and allow you to really show-biz the folks with maneuvers that are extremely difficult to follow.

I could go on with an outrageous description of the DB's proven superiority as a Combat plane, but won't.

Just think about this for a bit. About a year ago, Charlie Johnson (Yawnson) came out and said that .049 Combat was the lowest form of Combat and wasn't worth bothering with. I disagreed with that, and to show the "California Flash" that he was wrong, I shipped him a complete Dirty Beaver (ready to fly with engine, lines, handle, etc., all he had to do was put fuel in the bladder) and told him to try it out. Charlie did a complete 180 on his impressions of .049 Combat. He found that a proper .049 Combat plane can set even the most experienced Combat flier back a bit, with performance that is regarded as possible only with 35 size (AMA Combat) planes.

With that in mind, I want to say (if it's not already obvious) that the DB is not just a good .049 Combat plane, it is a good *Combat* plane, regardless of the size of the engine hung on the front. So, although the DB may be most attractive to those interested in getting into Combat, or younger fliers who are bucks-down and simply can't afford the bigger planes, it was actually designed by and for serious Combat fliers interested in doing a lot of Combat flying . . .

and doing it without going broke or dipping into the season's supply of AMA Combat planes.

I imagine that should be enough propoganda to throw at you, let's go into building a stock of DB's.

Check over the plans and get enough materials with which to build. The DB is quick to build, so being held up by not having enough wood or whatever is annoying. Notice the span, and that there will be a bit of waste if you use 36 inch wood. Sorry about the waste, but the DB is designed for performance, not economy at any cost. If you want, the span can be cut by an inch and 48 inch stock for the LE, TE and spars will eliminate waste. Your choice, but I recommend leaving the design as is, using the scraps as expensive epoxy stir sticks.

A template can be made of 1/16 ply and this used to cut ribs, one at a time, with a super-zoot Uber Skiver knife. Personally, I cut 1x7 rectangles of 1/16 and 1/2 inch balsa. Eight pieces of 1/16 and one of 1/2 are required per plane. A neat stack is made of these 9 pieces of wood, and all the ribs are cut in one quick session on the jig saw. Be sure to cut the ribs complete with

spar slots, LE and TE notches.

Remove the 1/2 inch rib from the stack and cut in the 1/4 square slot for the spruce bellcrank mount. The ribs are all ready to install when this is done.

Whack a couple of TE pieces out of 1/16 balsa. As long as your lungs are already full of balsa dust, go ahead and cut out all of the wood pieces required. Makes the actual assembly of the plane go a bunch faster. Don't forget the false ribs.

I suppose that you should decide which tail assembly to use before getting too far into this. The plans show two ways to do it . . . they both work just fine, but I personally prefer the normal, twin-boom system for this plane.

On your perfectly straight building board that is faced with a piece of Celotex (available at lumber yards), lay out a straight line that is used as a guide for positioning the TE piece. Also draw in lines that are at 90 degrees to this base line. These are used to position the center rib and tip ribs. With the TE, center and tip ribs properly aligned by these lines, everything else just kinda automatically falls into the proper place. A more elaborate jig may be used, but is hardly necessary.

Pin the bottom TE piece to the board. Be sure it is aligned with the previously drawn line. With 5-minute epoxy, glue the bottom spar and 1/4 square spruce sub-spar to the center rib. Before the epoxy sets, lay this assembly in place, gluing the center rib to the TE with Hot Stuff. A weight placed on the center rib will hold it in place until the epoxy sets up. From here on out, I use Hot Stuff for gluing. You can use whatever kind of glue you like, but Hot Stuff has come down a bunch in price, making it quite reasonable in cost. The LE is glued to the center rib (get it lined up pretty well). Now slip all ribs and false ribs into position and glue to TE, bottom spar and LE. Install and glue top spar and top TE piece. Slip in the 1/16 ply bellcrank platform. Good ol' 5-minute epoxy can be used here, if you prefer.

Mark the left tip rib for leadout location, and place a bellcrank in position on the platform. Using a straight-edge laid on top of the wing, one end over the forward leadout position the other over the forward arm of the bellcrank, mark all ribs for leadout holes. Do the same for the aft leadout. With an ordinary hand-held paper punch, punch a hole in each rib directly below each mark.

Take the framed wing off the board and sand the LE round. Just as well sand the whole thing while you're at it. With the LE shaped, glue the tips in place and add the 1/4 ounce tip weight to the outboard tip.

I forgot the bladder tube . . . hopefully you didn't, as it is rather difficult

to install at this stage of construction. An Estes BT-50 rocket tube is used for the bladder tube. It is cut to length and both ends plugged with 1/16 balsa. You can fuel proof it by sloshing dope around inside and then pouring out the excess.

With that, all you have to do is install the bellcrank, thread the leadouts through the inboard wing panel, attach pushrod to the bellcrank, and glue leadout guides to the inboard wing tip. Don't forget the triangular piece of balsa used as a pushrod guide, and a bit of structure to attach the covering to. With that, you can cover the wing. Most any kind of plastic film works fine, I use FasCal because it is cheap and strong. The tips are covered with Monokote, as it is much easier to work around the curves and gives some color to the plane, making it easier to see when flying.

The boom assembly is next, and it is pretty simple. The only thing about it that may cause problems is the strange looking control horn made with a 4-40 bolt and Rocket City clevis/button parts (stock no. 69). This assembly is called the Dirty Dan "Dial-A-Turn", and it is highly recommended if you expect to get the plane set up properly for maximum turn performance. A normal control horn may be used, but is definitely inferior to the "Dial-A-Turn".

With the boom assembly completed (including a couple of coats of clear), it is glued to the wing. If FasCal is used for covering, it is not necessary to remove the covering where the booms attach.

The linkage is now completed by soldering the Du-Bro coupler and threaded rod to the pushrod. Adjust the "Dial-A-Turn" to give equal stab deflection up and down and about 3/8 inch total movement. More or less stab movement will no doubt be required, but 3/8 inch is about all you'll want for the first flight.

The motor mount is cut out of 1/4 inch ply and simply glued to the center rib, after removing the covering in this area. This style of mount is plenty strong, although you probably don't believe it. If it bothers you, a couple of dowels can be installed, pinning the mount to the center rib. The plans and pics show a 1/16 ply doubler on the mount, but this is not necessary either.

Next up is mounting of the Cox TD .049, and this is where you better pay attention. I personally like my DB's to balance 1/16 inch back of the bottom spar, but this makes for a very touchy airplane. Many people have difficulty flying my DB's level, they are so touchy. So you probably ought to try for a balance point just slightly in front of the bottom spar for best results on that first flight. With rubber bands holding engine to mount, shift engine back and forth until the plane balances where you think you want it. Mark this location and drill mount for 2-56 bolts.

Install engine with these screws and double-check to be sure you don't have some up or down thrust in the engine. If you want, a bit of out-thrust can be used, but it is not necessary if the plane is built straight.

Speaking of being built straight, check to be absolutely sure there are no warps in the wing. When viewed from behind, the TE of the wing would appear to be centered on the wing along its entire span. Do not expect a warped DB to fly very well. Do expect a warped DB to chase you across the circle!

With that, your DB should be ready to fly, so let's discuss the other equipment required for serious .049 Combat. The engine is very important . . . the DB loves power and you should give it all you can. This means a honkin' TD .049 (or .051, although the .051's don't have any more power). A talk with locals who are involved in 1/2A Speed may help you to get more power out of your engine. Or the local F/F guys *may* be of some help. It has been my experience that F/F guys actually know very little about reworking engines and I offer Bob Stalick as proof positive of this statement! (*Oh, Oh. Here they go again! wcn*)

For more power without having to do it yourself, contact Joe Klause at Kustom Kraftsmanship, P.O. Box 2699, Laguna Hills, CA 92653, or Carlos Aloise, Jr. at Aloise Engineering and Development Co., 2314 Loy Lane, Los Angeles, CA 90041. Both Joe and Carlos know how to rework the TD's into screamers and also charge a reasonable fee.

At the least, use a TD that has been well broken-in. An absolute necessity is to use a Kustom Kraftsmanship .049 needle valve assembly. Either order it from Joe or get one at your local shop.

Use of high nitro fuel and itty-bitty props will help to get the power and rpm required to properly motivate a DB. I regard 60% fuel as about right, and 40% as a minimum. In trying many blends of fuel, I have settled upon Nitrotane's 1/2A 60% and 1/2A 70% as the best, and highly recommend them. A Top Flite 5-1/4x3 nylon is a very good and practical prop, while a Top Flite 5-1/4x3 wood Power Prop offers a bit better performance . . . they also break easily, however.

With the right fuel and the mentioned props, your engine ought to be able to make at least 23,500 rpm, which I regard as the minimum needed to properly haul around a DB. An rpm figure of 25,000 plus is even better, but takes a pretty special engine to achieve.

For maximum power and consistent runs in maneuvers that are quite violent, a pressure system is needed, and the bladder system, now so common in AMA Combat, is the way to go. Most any bladder will work just fine, but I

have the best results with either a small Tatone bladder or the new Midwest surgical tubing bladders, again in the small size. Both of these bladders are too long for the tube in the DB, so need to be shortened an appropriate amount. I use bladders that are about 1-1/4 inches long.

For a feed line from the bladder to the engine, use the smallest surgical tubing you can find. If it slips off the nipple on the needle valve assembly when flying the DB, then the tubing is too big.

The bladder is filled with a 2 ounce syringe. If your shop doesn't have any (they should, Tatone markets one), then drop in to see your local vet at his Fido Hospital and ask for a 2 ounce dose syringe.

It is very important to use the proper size and length of lines on your DB. In this area, we use .012 dia. x 35 foot lines, and would never consider another size, at least for two-up Combat flying. If all you want to do is to Show-Biz the locals, then .008 x 35 foot lines are great, but they are very fragile and will surely get cut the first time you get in any kind of line tangle while flying Combat. Lines shorter than 35 are not recommended, as the turn rate on 35 foot lines is already faster than you are used to on an AMA Combat plane. Just staying up, while trying to fly level and with two guys in the center (after a kill has been made, for instance) is a real problem when both guys are running flat-out.

A special handle for .049 Combat is also necessary. The leadouts on a regular handle (like an EZ-Just, for example) are simply too stiff to be worth using on these planes that have very light line tension. I make my own handles from 3/4 inch plywood, and use old .018 Combat lines for leadouts. A bolt through the handle locks the lead-outs in position and allows adjustment of the handle. For a "quick 'n dirty" .049 handle, pick up either a Goldberg or Sig number. The dacron supplied with the handle may be used for leadouts on the handle, which works just fine.

Before going any further, I want to reemphasize the warning about having your DB too tail-heavy. If you set it up like mine, chances are very high that you won't like the plane at all, finding it to be very hard to fly level, let alone pointing it through maneuvers. Right now, go over and check your new DB for proper balance point. If the balance point isn't at least at the forward edge of the spar (preferably in front of it), then add some weight to the front of the

plane until it is.

Right now you are probably wondering why I like the DB on the tail-heavy side. Good point, and I'll tell you why. In this area, we developed our .049 Combat planes to use as practice planes. They are not for contest work, they are for going out once or twice a week and flying "grudge" matches against the meanest, baddest Combat fliers you can find. I have found that it is to my advantage to fly touchy, wiggly, mean-bad-'n-nasty .049 Combat planes. This style of plane requires constant attention while flying. Make a wrong move and you miss a cut or kill . . . maybe even smack the ground. Put simply, this kind of plane gives you a very "educated" hand in a short time.

Once you do get to the point where you are effective with a plane set up like mine, a good, honkin' Fast Combat plane feels extremely pointable and docile. *Docile!*? An AMA Combat plane that feels *docile*? Yes, that's right, but you'll have to try it before you'll believe me. I've given you a shot at it with this article . . . all you have to do is build a design that took me two years to develop to this point.

While checking the balance point, I hope you also made sure there are no warps in the wing, no left-thrust in the motor, wing tip weight installed, and insured that there is no more than 3/8 inch total movement in the stab. If you have 1/4 inch total movement, that is fine for the first flight, at least.

We're ready to go flyin'. Hook up the lines and be sure that level at the handle corresponds to level at the stab. Your first flight may be a bit much for you, and the last thing you need is a handle that is out of adjustment. With the 2-ounce syringe, fill the bladder with fuel. Don't overdo this, as an over-filled bladder will give "false" pressure, resulting in a lean setting when the bladder relaxes a bit. I normally fill the bladder with about 3/4 ounce of fuel.

With a clamp, pinch off the fuel tubing until ready to start the engine. Open the Kustom Kraftsmanship needle about 1-1/2 turns. Prime the motor just a bit through the exhaust ports. Hook up the glow clip (always use a fresh, hot battery when starting a TD . . . I use a 2-volt lead-acid battery, and it's the hot tip for getting a TD to light off quickly) and you're about ready to fire it up.

Remove the clamp from the feed line and hold it pinched off with one hand. Don't release the line until the

engine starts. Flip the prop as quickly as possible. "Lazy Flippers", using old batteries, have an incredible amount of trouble starting TD's. Do it right and they'll start almost as easily as any other high-performance engine normally used in Combat. When the engine fires on the prime, quickly release the feed line. If the engine goes rich instantly (quite likely), give the feed line a pinch or two to get the rpm up and screw the needle in a little. Keep at it until the engine is running WFO. With the engine screaming, open the needle up until it is again a bit rich and running slower. When the DB is launched, the engine will lean out some and hopefully be right on as to needle setting. If not, adjust needle accordingly before the next flight.

With the engine set right, be sure your launcher doesn't ruin your whole day. Tell him to release (not throw or push) the DB straight ahead and just a little bit up. You be sure to help out by taking a step or two backwards as the plane is launched.

Once in the air, you're on your own. Wring it out for all it's worth and be prepared for a shock in the performance department.

There is a lot of talk within MACA, that super Combat organization, about having .049 Combat as an added attraction at the '77 Nats in Riverside, California. It will probably be an after-hours thing and may or may not be flown to an official set of rules. Larry (Lone) Renger, of Cox, has arranged for trophies to be donated by Cox, so it is quite possible that .049 Combat will come off as an added Combat event at this year's Nats.

Even if the plans fall through on the .049 Combat thing, there will be a number of us there with .049 planes, and we'll be looking forward to doing some heavy practicing with them. Bring a few Dirty Beavers of your own and take on people such as Rich "von" Lopez, Gary Stevens, Phil Granderson, Dirty Dan, etc. Even Charlie Yawanson might have some .049 planes with him!

To participate more fully in Combat, and to be up to date as to what is happening in Combat, be sure to join MACA (Miniature Aircraft Combat Association). To join, send \$6.00 to: MACA Treasurer, Tom Southern, 2207 Paul, Longview, Texas 75601. In belonging to MACA, you'll be part of the most progressive of the special interest groups now functioning within the AMA. As a bonus, you'll be getting a monthly newsletter that is anything but dull! ●

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