

>>> 'B' Prepared >>>>

FROM LOOP TO BUNT - ANDY ELLISON CONTINUES HIS GUIDE TO PASSING THE BMFA 'B' CERTIFICATE

Most sport-scale designs are ideal 'B' Certificate aircraft. Often the bigger ones, like this World Models Midget Mustang, fly better and make the pilot's job a bit easier.

Our last look at passing the 'B' Certificate ended with the model completing the inside loop and heading off at the correct height and line in readiness for the dreaded 'bunt' (a.k.a. outside loop), performed from the top.

Unusually for the 'B' test this manoeuvre has an option that may be adopted specifically by pilots of scale models which, for reasons of structural strength, power or control limitation, can't perform an outside loop. The option is to fly a manoeuvre called a split 's' or reversal, and we'll take a look later as to whether you and your model are eligible for this



option. First, however, let's consider the bunt itself.

e). Fly downwind and complete one outside loop downwards from the top, i.e. a bunt. As the bunt (see Fig. 1) needs to be performed both downwind and from the top, some thought has to be given on how the aircraft is going to achieve the correct height and line to execute the manoeuvre without rushing. Throughout this test the pilot is required to change circuit direction a number of times and, as mentioned in previous parts of this series, these periods are perfect opportunities for the pilot to buy himself a few extra minutes for relaxation and concentration. Whilst the examiner won't include these turns as part of his test assessment, they will give him some indication as to the amount of

thought and practice that you've put into the test schedule. Clearly, if you try something flash and cock it up he'll be forced to reconsider!

Whilst the required height gain may be achieved by flying a further circuit in the wrong direction at increased power, there will still be the opposite hand 'switch' to deal with. You may think it best to continue flying on right out of the loop to the far end of the circuit and gun the motor, climbing in a half loop before rolling off the top (Immelman turn), heading downwind at an increased rate of knots. The trouble with flying in this way is that whilst you might well achieve it admirably your positioning will have to be spot on, and it won't leave you much time for adjustment to line if required.

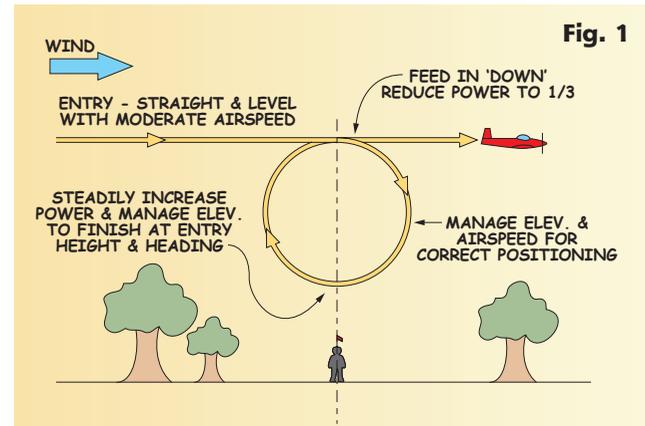
The best turn to make here is a climbing, procedure-type turn. Here

Upon cresting the top of the bunt you should be at full power again...

Passing your 'B' isn't only about getting a piece of paper like this, the practice and the experience of the test will make you a more confident and accomplished pilot.

You won't get a pass on flying ability alone. Questions will be asked!

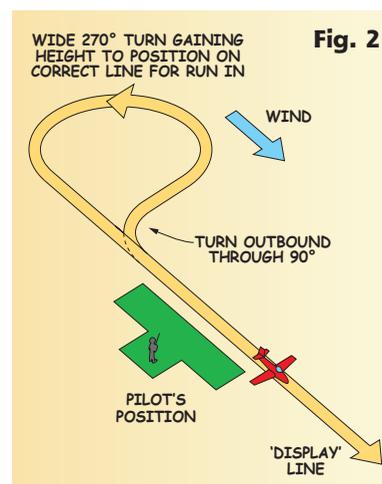




the model turns away from the looping circuit as if making a standard circuit turn, but after the first 90° of the arc the turn is switched to the opposite direction and a smooth, climbing 270° arc flown outside the boundaries of the normal circuit but ending on the correct line and at increased height for the bunt. Flying outside the normal limits of the circuit in this way will buy considerable extra time and provide a long run in to the top of the bunt, during which you can adjust your line and speed if required (see Fig 2.)

So now you're on the correct path (up on the 'display' line), between the two standard circuit legs but high enough to complete the manoeuvre downwards from the top. Let's take some time out here to deal with a popular misconception: The bunt does not need to be superimposed on the path of the loop you've just flown - if you normally fly like that then all well and good, but you won't be failed for not doing so. A further misconception is that the bunt has to be the same diameter as the loop. This is also not true, and unless your model has abundant power to climb and accelerate upwards from the bottom of a stretched manoeuvre back to the entry point, it's actually quite hard to achieve. The most important aspect of performing this manoeuvre is to get the entry and exit points close together. Most failures in the bunt occur when the path of the outside loop is tightened to produce something that looks like a number 6 rather than a clean circle.

The bunt should be entered with decent speed and downwind to ensure that the first part of the arc maintains an adequate curve. To achieve this fly along the chosen line at full power and as you approach the starting point reduce the power to at least $\frac{1}{3}$



(closing the throttle to idle can lead to carburation problems when you open it up again). As you reduce power start applying down elevator and, as with the loop, concentrate on keeping the wings level and fly a large-ish but smooth downward arc. Remember what I said about keeping the manoeuvre a reasonable size, but not so tight that you just flip around it. Note that whatever height is lost in the downward part of the bunt will need to be regained on the upward side. As you approach the bottom quadrant of the circle you'll need to think about increasing power. Some models are happy to round the bottom of the bunt before smoothly applying power, whilst others need to fly the full inverted section with increasing power.

The point just past inverted with the model starting to climb is where most bunt failures occur. There's a tendency to hold in the same amount of down elevator that was used to push the model over initially. But with the slowing airspeed of the climb this throw will prove too much and the model will exit the bunt much lower

Since the bunt is just the manoeuvre to show up any problems with the model's lateral balance, side-thrust and carburation, it's worth getting them sorted during practice sessions.

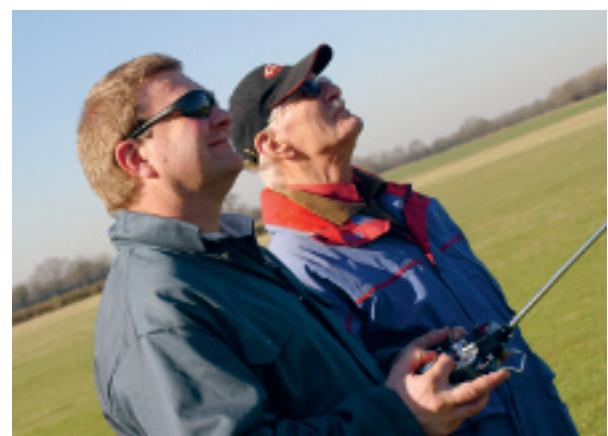
than its entry point. This being the case it's essential that the amount of elevator is reduced as you begin the climb back upwards, sending the model in an arc that culminates at the same height and line as the entry (see Fig. 3). Upon cresting the top of the bunt you should be at full power again, ready to reduce to cruising speed for the descent back down to the basic circuit height.

The bunt will show up any problems in the model's lateral balance, side-thrust and carburation. Bear in mind that excessive elevator throw is often difficult to manage in the small quantities required to fly an accurate arc back from the bottom, so take care to trim these issues out of your model aerodynamically.

SPLIT OPTION

As I mentioned earlier, if you're flying a scale model that lacks the power and control needed to fly the bunt correctly you can request (before the start of the test) to fly a split 's' or reversal. Since it's the pilot (not the model) that's on test, your examiner won't allow the alternate manoeuvre if he considers the aircraft is capable of performing a bunt.

Examiners can be wily old dogs, but they're still human and may allow a little error in the positioning of the rolls if they're seen to be flown accurately.



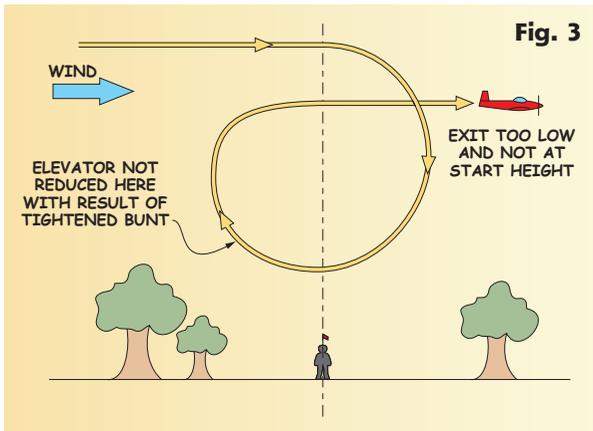


Fig. 3

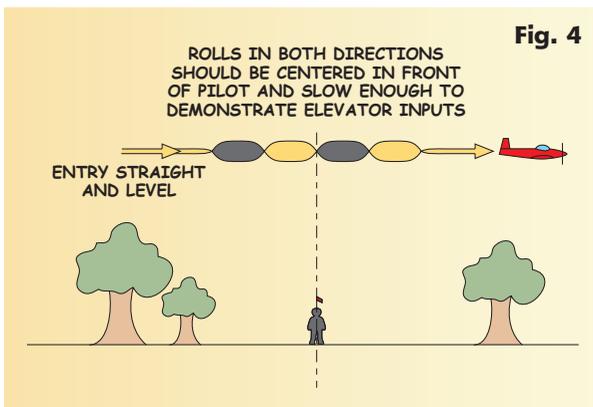


Fig. 4

model inverted, and as it begins to slow, up elevator should be applied to perform a smooth and rounded half loop downwards back to straight and level flight on the standard line. A poor exit heading or a half loop that's too tight are legitimate grounds for failure. The model should then be accelerated to cruising speed and repositioned for a transitional circuit (if required) to come around into wind for the next manoeuvre, consecutive rolls.

If you flew the bunt you'll still be at altitude, and that will need to be lost. You could, of course, fly a reversal at the end of the circuit (discussed earlier), but it may leave you out of position and carrying excessive speed. I find it better to fly a procedure turn, but this time descending all the way down to the correct base line height and on line for a run into the first set of rolls. As you'll be heading downwind at the exit of the bunt, flying this descending flight path will change the circuit direction and lose excessive height in a slow, controlled manner that gives you some thinking time. Time to steady your nerves and adjust your speed.

afterwards! At 'B' Certificate level there needs to be a little more care applied. Twinkle rolls performed at blurring speed aren't acceptable! The rolls must be slow enough to demonstrate elevator control throughout. This means that as the model flies through the inverted stages, some down elevator should be seen to be applied as required. If you're capable of rolling your model so slowly that rudder inputs through the knife-edge portions are also needed then that's great, but you're not required to do so in the 'B' test.

Positioning is once again crucial, and the model should be halfway between the two rolls (i.e. upright) as it passes the pilots centreline (see Fig. 4). The examiner may allow a little leeway here if the rolls are accurately flown. Note also that the rolls should be along the standard line at the standard height, i.e. in common with most other 'B' Certificate manoeuvres.

There are some more misconceptions to be dealt with here. There should be no pause between the rolls. Instead they must be flown consecutively with the model rolling twice at a reasonably continuous rotational speed, without hesitation.

If you use a high wing trainer for the test, your examiner may allow some leeway in the requirement to make the rolls as axial as possible.

If the split 's' is to be flown it can be performed either upwind or downwind, on the standard line but higher up, as with the bunt. Unusually the manoeuvre isn't performed in front of the pilot but at the end of the circuit, i.e. with initiation perhaps 100 yards or so to the side.

From level flight the model is rolled to the inverted position, where it must maintain altitude for a period of a second or two. At this point there should be no noticeable deviation in flight path, and some down elevator may be required to hold the line. The throttle should be closed with the

Remember, you'll be wanting to start the bunt on a downwind heading.



f.) Complete two consecutive rolls into wind. This manoeuvre sounds fairly innocuous but is actually fraught with problems, especially for those pilots whose usual performance of consecutive rolls is to bang the stick over until they've had enough and sort out the ensuing mess





There should also be no discernible loss of height throughout the rolls, but some level of barrelling is permissible. This is especially so if the model chosen for the flight is a typical high-wing trainer type that, due to its wing section and often sluggish aileron response, is more difficult to roll axially. The rolls do not need to be performed at full throttle. Most models will roll quite well at normal circuit speed, indeed to try and fly rolls with increased speed will create positioning and rotational speed problems. That said, as with the rest of the flight, it's essential that you perform the rolls as you've practiced. Don't be tempted to slow them down on the day in the hope of impressing your examiner, as you're bound to make a mistake!

There are some tricks that can be brought into play to help you perform the rolls more easily, one of which is to elect to roll in your 'worst' direction first. Most sport pilots who have been flying long enough to achieve 'B' Certificate status have developed some bad habits along the way and 'handed' rolls are just one of them. If you pitch for your worst direction first (you'll know what that is from practicing) and make them messy but passable in the eyes of the examiner, there's a good chance that he'll give you the benefit of the doubt ahead of flying the opposite direction rolls that will be coming next. Make a brilliant job of the latter and he may let slide any slight mistakes incurred during the first set.

It's very common to see test candidates struggling to stop rolling too fast, but by employing rate switches to give the required slower roll rate at full stick travel, a pilot can ensure a uniform rotational speed



with the aileron stick held fully over. This will afford some extra concentration time to focus solely on the elevator inputs. One more thing: Don't forget to make a good mental note of the direction of your first set of rolls, as those that follow will need to be executed the other way!

g.) Complete two consecutive rolls downwind using the opposite direction of roll rotation to that used in f.) Everything that I've just discussed above also applies here, but note that the model will be moving considerably faster as you fly downwind, eating up valuable

A good trainer will be capable of taking you through to 'B' Certificate level, so don't abandon it too soon.

Don't be frightened to use the tools at your disposal to help you through the test. That aileron rate switch is just what you need to stop you rushing your consecutive rolls.

positioning time. Give some thought to how you're going to swap circuits to the downwind and line up for the rolls. A procedure turn will ensure you can get around without affecting height or speed, but this time flown flat and not climbing or descending as before.

With the model on line at the correct height you should fly the opposition rolls centred about the centreline with the model upright as it passes the pilot's box, rolling without hesitation. Discrepancies in the positioning of the rolls on the downwind leg are tolerated to a degree, but a big error on centring will see a fail. And don't get caught out by rolling in the same direction as performed earlier, otherwise you'll be asked to fly the task again.

Exiting the rolls at the standard height, line and speed will almost certainly see the examiner ask you to fly straight into the next manoeuvre, the stall turn, which we'll look at next month along with the spin. Until then, remember those safety codes and keep swotting!

Remember, twinkle rolls with a model like this are not what your examiner is looking for.

Your examiners pen will be poised over the pass certificate. Don't forget to bring your BMFA membership details in case he has to fill it in!