

Circling and The Three Bears

Don't be fooled by illusions when you have to make a close pattern in low visibility

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The circling approach at minimums is an IFR maneuver, but it's done in visual conditions.

It looks easy and it's not usually given a great deal of emphasis in instrument training. But it can be a fooler.

Like Goldilocks exploring that strange cottage in the woods, the unwary pilot is likely to be in for a few surprises the first time he tries the circling approach under actual instrument minimum conditions. Unlike the bear family in the story, however, these surprises are more like real bears—unpredictable and potentially

troublesome to the unprepared.

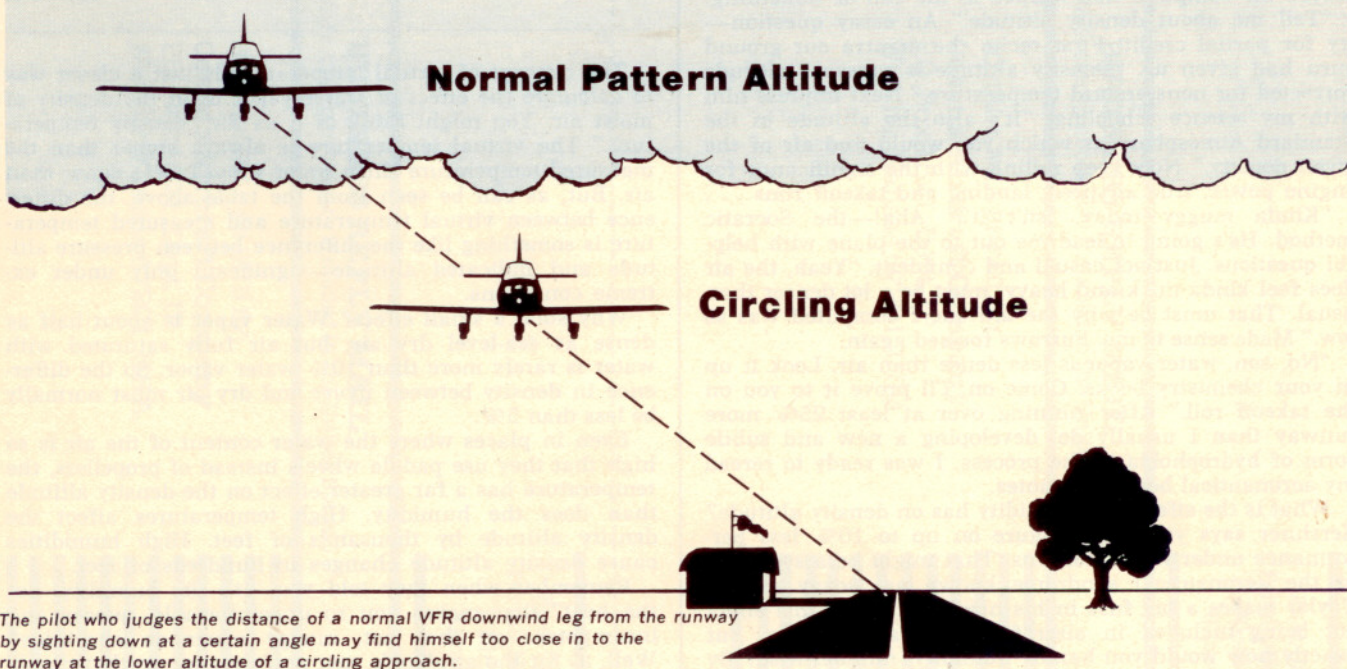
Why should there be any surprises in a well-known procedure like the circling approach? After all, we always hear that the ILS approach is the one that is the most demanding, and a great deal of emphasis is put on making the transition to landing from only 200 feet agl. So, how could any approach with 500 or 600 feet under the MDA not be easy?

For one thing, it's difficult to simulate the circling approach effectively for training purposes, especially the menacing appearance of low ceiling and low visibility conditions.

For another, it just doesn't happen that we encounter true minimum conditions very often; usually the circle-to-land maneuver is made in VFR conditions and is no more difficult than flying the regular traffic pattern. So, when that time comes when you really are at IFR circling minimums, what will the surprises be? Here are three of them, hence the reference to the three bears.

The first surprise is an illusion that you're going too fast. Circling minimums are as low as 500 feet agl, frequently 600 feet, but our visual perceptions of speed have been developed

Figure 1



The pilot who judges the distance of a normal VFR downwind leg from the runway by sighting down at a certain angle may find himself too close in to the runway at the lower altitude of a circling approach.

through experience in flying traffic patterns at 800 to 1,000 feet. So the apparent speed, based on visual cues from the ground, will be anywhere from 50% to 100% faster than true speed.

I recall from my first experience with this that I had an almost irresistible urge to slow the plane down. Thank goodness for the stall warning horn! I found that great concentration was needed to keep the speed even up to a modest 1.5 V_{so} , and it left the feeling that the whole approach was going to be hurried from then on.

The second surprise is that you'll fly much closer to the field in the circling maneuver than you might have intended. On downwind, for example, our habit is to judge our distance from the runway by reference to some fixed angle with respect to the airplane (Figure 1). At only something like half the normal pattern altitude this angle-sighting process puts the aircraft much closer in than usual. Reduced visibility also produces a desire to stay in close. The result of all this is that the normal turning maneuvers may have to be tightened up considerably. There is a real tendency in this case to overshoot the centerline of the runway, especially with an adverse crosswind. And, of course, excessive banking compounds the danger of the

slow speed leading to a stall/spin.

The third surprise results from the tendency to start down too soon. Many of us have the habit of descending from traffic pattern altitude at a point on downwind opposite the runway threshold. At the circling minimum, this is too soon, mainly because there is much less altitude to lose. It's also illegal to go below the circling MDA until "in a position from which a normal approach to the runway of intended landing can be made." For practical as well as legal purposes, therefore, it's best to hold off descending below the MDA until set up on the base leg or turning final (Figure 2).

What happens if you're the victim of all three of these illusions? You wind up slow, low and in a steep bank trying to line up with the runway. Not a good place to be, but it can happen.

Now, how do we avoid the three bears?

As in so many other aspects of instrument flying, planning is the biggest key to success. And the first item in this case is to plan what runway will be used and how the circling maneuver will be conducted.

To begin with, you may not have to circle at all. If the conditions are marginal for circling and the wind is not too strong, you may consider it safer to go ahead with a crosswind landing on an ILS runway (usually the longest one) than to circle for the runway that happens to be favored by the wind. Remember, you *can* ask the tower for the straight-in approach, and they will accommodate this request if at all possible.

Assuming the airport has no tower, a little more of the planning responsibility falls on the pilot. Whereas wind may be the sole factor in determining the runway in VFR conditions, the configuration of the circling approach itself should now be studied and again may even suggest that it would be safest to land with a crosswind or even a slight downwind component. The key thought here will be to maneuver in such a way as to keep the desired runway in sight at all times.

Of course, it is just possible that there may be too many uncertainties to really decide the runway in advance, especially at an unfamiliar airport. In this situation, possibly the safest rule of thumb is to proceed directly over the airport in order to get a good look at it. Then, having decided upon a runway, concentrate on keeping the airport in sight. Usually this will mean turning to the left, even if it means circling the entire airport.

The final element of planning is that of getting the landing checklist completed prior to beginning the ap-

proach. The aircraft should be in its approach-to-landing configuration and trimmed for an appropriate circling speed. The missed-approach procedure should also be studied. All these steps will avoid having to divert attention away from the airport itself during the circling maneuver.

As for the circling maneuver itself, your principal defense against the illusions of speed, distance and altitude—the three bears—will be just in knowing that they're there. Determine to maintain proper airspeed. Swing as wide on the turns as visibility will permit. Watch the altimeter and don't go below the MDA too soon. Those are the three secrets.

When it comes to night approaches, all the problems become aggravated. You, the pilot, are probably tired. Many towers will have closed down and, for sure, anyone who might have answered the Unicom will have long since gone home. The illusions are all much more pronounced when your visual reference is by means of lights only. And speaking of lights, you may have to remember to turn on the runway lights with your radio. All in all, night circling approaches at minimums can be demanding, and they're not for the pilot who isn't truly familiar with the aircraft and with instrument flying.

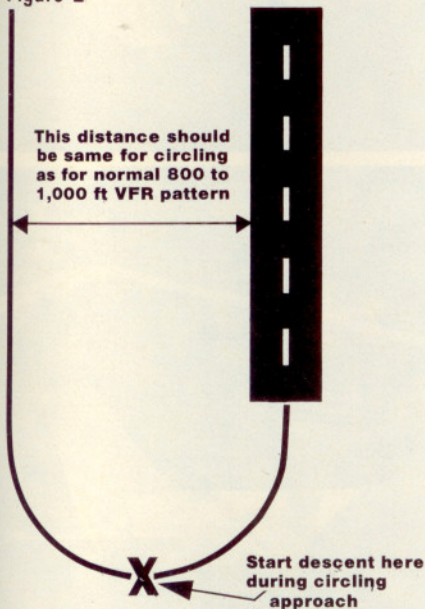
The story is not complete without a reminder that the missed-approach procedure is there to be used if necessary. Sure, it seems a shame to abandon the landing after the airport has been sighted once. But if you've lost sight of the airport, you are indeed lost—flying around at 500 feet agl looking down at backyards and parking lots, wondering which road leads to the airport. The only answer is the missed-approach procedure. And, if you elect to try the approach again, you'll at least have the advantage of a much better idea of what's ahead.

Check Part 1 of the Airman's Information Manual for specific go-around tips after a circling approach. Another reference is FAA Advisory Circular 61-27B "Instrument Flying Handbook."

Circling is a useful maneuver and indeed a necessary one at many smaller airports where it is the only way to conclude the approach for a landing. Most circling is done under VFR or near-VFR conditions. It is just that, at or near minimum IFR conditions, the wise pilot will plan ahead and be prepared to encounter some unusual perceptions of airspeed, position and altitude.

While Goldilocks became frightened of the three bears and ran away, the good pilot need only be aware, not frightened. □

Figure 2



Since the downwind segment of a circling approach already is lower than that of a normal VFR pattern, the descent should be postponed until base leg or even the turn to final.