



# SPINOFFS

## *Design Deficiency*

*By Gene Beggs  
Contributing Editor*

After my years of spin tests and after spinning dozens of different models of aircraft, I now believe that in those extremely rare instances when we encounter a spin mode in an aircraft where the power-off, hands-off, opposite-rudder method of emergency spin recovery will not work, what we have discovered is not a flaw with this "new" method of emergency spin recovery, but rather a design deficiency in that model of aircraft. In the overwhelming majority of spinable aircraft, the power-off, hands-off, opposite-rudder method of emergency spin recovery that I advocate works beautifully in all spin modes in spite of being different from the method of spin recovery shown in the aircraft flight manual.

It is my belief at this point that when we encounter an aircraft that has a spin mode in which we cannot recover using this "new" method, we have found an aircraft that does not have enough tail damping force (TDF) to overcome the "pro-spin" forces created by the wing during auto-rotation. That aircraft has simply demonstrated that it has a design deficiency and needs more tail damping force. Tail damping force is provided by the overall side area of the fuselage and the nose section, landing gear, vertical stabilizer, rudder, dorsal fins, vertical fins, etc.

In those extremely rare instances, where we encounter a make and model of aircraft that has a spin mode from which we cannot recover using the "new" emergency spin recovery, it might very well be that with a very slight modification, such as the addition of a little bit more dorsal fin area or rudder area or perhaps by increasing the rudder travel by a couple of degrees, this would completely eliminate the problem with that particular aircraft. Of course, we must remember that this can only be determined by very careful, in-flight tests. Please bear in mind that even in those extreme cases such as the spin mode discovered in the C-150 to the left and the spin mode to the right in the T-6, (EDITOR'S NOTE: Refer to the "SPINOFFS" article in the October 1985 issue of SPORT AEROBATICS.) the only thing else that had to be done was to push the stick forward, after the aircraft had shown that it did not have enough rudder power to stop the rotation and allow the nose to fall through on its own.

It would be such a shame to discredit this wonderful, life-saving method of emergency spin recovery that works so astonishingly well in the overwhelming majority of spinable aircraft for the sake of a handful of poorly designed aircraft insofar as spins and spin recovery are concerned.

It amazes me that there are some individuals who are so adamantly

against adopting this "new" hands-off, power-off, opposite-rudder method of spin recovery as the "standard" recovery. I think it is just natural human nature to resist change. Actually, when you analyze it, this method is not so different after all. The only thing that is actually different is to let the stick (or yoke) go free and leave it to do its own thing, which eliminates any chance of the pilot aggravating the spin by erroneous control inputs from the elevators or ailerons if he is confused or disoriented. Remember, if you cut the power and let the stick go free, there is no possibility at all of making a mistake!

The airplane cannot make a mistake! The flow of air over the control surfaces and the laws of physics and aerodynamics will place that stick in the most perfect position for the recovery, which will be accomplished by looking right straight down the cowlings and pushing and holding full opposite rudder. If the aircraft is properly designed and has enough tail damping power, the spin will slow and stop and the nose will drop, the controls will abruptly snap to the true, neutral position, and you are out of the spin! In those extremely rare instances in those rare aircraft in which the stick remains in its stalled position, the only thing else that is necessary for the pilot to do is to look at the stick and either push it forward or pull it back, depending upon whether the stick was forward or back. So

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what is so different about that? What is there really to disagree about?

The beautiful part about this power-off, "stick-free," opposite-rudder method of spin recovery is:

1. The pilot does not need to recognize what type of spin he is in. The recovery procedure is the same whether the spin is upright or inverted, left or right.
2. There is no possibility of the pilot simply reversing the spin with the rudder while desperately clutching the stick and holding the elevator in the stalled condition. With the stick "free," it will snap to the neutral position as the rotation stops and the nose goes down and no further spinning is possible.
3. It is impossible for the pilot to "transition" an upright spin into an inverted spin or vice versa by overcontrolling.
4. It is impossible for the pilot to aggravate the spin by inadvertently cross-controlling with opposite aileron, which will produce a flat spin in many aircraft.
5. It is impossible for the pilot to unknowingly create an accelerated spin by applying nose down elevator while "pro-spin" rudder is still present.

So there you have it. The facts have been presented. Decide for yourself and draw your own conclusions. Please understand that I am not advocating doing away with the old, tried and true "standard" method of spin recovery, which is power-off, full opposite-rudder followed immediately

by a brisk application of full nose-down elevator. We use exactly this method to make a precision recovery from an intentional spin in an aerobatic routine in competition. The hands-on method works great and we must use it in competition in order to get top scores.

In closing, let me emphasize some very important points:

1. My primary concern when developing my advanced spin training course was with those pilots who were flying aerobatics in the Pitts Specials and the Christen Eagles. I can assure you there will be no problems or surprises with those aircraft.
2. If I have not thoroughly tested a particular make and model of aircraft, of course, I cannot assure you that my methods and theories will apply to that particular aircraft.
3. I am providing this information to our readers in the hope that they will seek out a qualified, professional aerobatic instructor, who can familiarize them with the latest discoveries regarding spins and spin recoveries. I am not recommending that pilots go out and experiment on their own. There can be no substitute for good dual instruction from a competent, professional instructor. If a pilot has the slightest doubt in his mind about his ability to recover from any spin, he should not go out and experiment on his own.
4. Never spin an aircraft that is placarded against spins! To do so is inviting disaster! In this type of aircraft the answer is to simply

be proficient enough at slowflight and stalls so that you will never accidentally stall. If you avoid accidental stalls, you eliminate the possibility of an accidental spin!

My good friend, Jim Patton, who heads up the NASA spin research program at the Langley Research Center, said it very well when he quipped, "Beggs, what you really need, in addition to this Advanced Spin Training Course, is a course designed for those who do not want to spin!"

How true it is, Jim. What you are referring to there is an "Advanced Stall Training Course." If a pilot is thoroughly familiar with all types of stalls and is proficient in stalls in his aircraft, he need not be concerned with entering an inadvertent spin.

I teach two distinctly different types of spin recoveries in my aerobatic courses: (1) the hands-on, precision method of recovery and (2) the "stick-free," "emergency" method of recovery. If a pilot knows exactly where the aircraft is and what it is doing, then he should use the precision hands-on method. If he is confused or disoriented and the requirement is to simply get the aircraft out of the spin in the shortest period of time with the least loss of altitude, then he should go immediately to the power-off, hands-off, opposite-rudder method.

If you have any questions or if you have anything positive and constructive to add to this, please call or write to me either in care of SPORT AEROBATICS magazine or at my office: P.O. Box 6411, Midland, TX 79701. Phone: 915/563-1441. Happy flying!