

Aerobatics and Spinning in the Yak-52

I am writing this because I feel that many of us – and I include myself - have been too casual about the characteristics of the Yak-52, very particularly during spinning.

The Yak-52 is a delightful aeroplane, offering great aerobatic ability and ‘fun to fly’ characteristics with military-build quality for unbelievably little money.

Nevertheless, consistent and safe spin recovery needs practice and particularly after a recent accident involving a highly experienced aerobatics pilot I am concerned that too many people are flying Yak-52 in aerobatics, which can intrinsically lead to spins through mishandling, or indeed deliberately spinning without sufficient training to be absolutely certain of recovery.

To be specific:

- It is not difficult to get into a flat spin through a mishandled stall turn – particularly, as is normally the case, power is kept on. Therefore one should not think that because one is not deliberately spinning that one would never get into a spin.
- The 52 is a heavy aircraft with a significant amount of rotational inertia in a flat spin. This is because there is heavy engine in the front and a heavy radio and other equipment behind the rear seat and therefore once the aeroplane begins spinning, it will take time for that inertia to be destroyed and for the aircraft then to recover from the spin.
- In particular, if the spin is allowed to fully develop into a power-on flat spin, the rate of rotation can be rapid and disorientating, and importantly, the more rapid the spin, the greater the rotational energy to be stopped before the spin slows down and therefore the longer the spin recovery. This can lead to the rate of rotation increasing during spin recovery before slowing down, which can be disconcerting if not anticipated.
- Closing the throttle will not in itself cause any recovery.
- Once the flat spin has fully developed it can take up to four complete revolutions for recovery to be made and of course much more if the absolutely correct control movements are not used. Additionally there will be further height loss during the return to level flight.
- It is also possible while recovering from a spin with a lot of in-spin aileron and forward stick, for the rotation to convert rapidly into an inverted spin. Again, this must only be demonstrated with an appropriate instructor.
- Stick forces on both elevator and rudder in order to move the stick forward and to obtain opposite rudder can be very high. This can give the impression of jammed controls if one is not used to it and this can only be achieved through practice with an appropriate instructor. It is interesting to note that a Russian flight manual says that the rudder forces can be as high as 100 kilos (220 lbs) and stick forces 40 kilos (90 lbs), and says that two hands maybe necessary to move the stick forward.
- We know of at least two Yak-52 aircraft that after a fully developed flat spin (ie four or so turns) will NOT recover with the conventional spin recovery of full opposite rudder and full forward stick, but need in-spin aileron to recover. Again, this should not be experimented but practised with an instructor.

- If practising spinning, total height loss can be dramatic and even with absolutely correct recovery procedures, height loss for recovery can be in excess of 2000 ft and a bit more to level regain flight. For this reason spin practice of this sort should be commenced at a minimum of 6000 ft and recovery initiated by 5000 ft.
- Several 52 accidents have been attributed to one of the pilots harnesses catching the brake lock on the stick. This obviously varies with pilots, but before any aerobatic flight is commenced, a very complete 'full and free' check should be made to ensure that this cannot happen. Specifically there are two types of brake catch (the new one dating from approximately 1989) and two types of harness, the early buckle type and the later pin type. Apart from anything else the old 'buckle type' should never be used today, but the newer 'pin type' can catch with the old model brake catch.
- Finally, there is the potential problem by virtue of being a tandem cockpit aeroplane that there is misunderstanding between the two cockpits. This is common to all such aircraft, but it emphasises the need for a thorough briefing on all procedures before any aerobatic flight. This should also cover all emergency procedures, and a formal understanding about a bottom height during spinning at which the occupants will jump clear of the aircraft if the spin has not stopped. In Russia this is 1000m / 3300 ft.

In conclusion, **any** Yak-52 pilot who intends to do anything more than pure straight and level flight **must** undertake proper instruction with an instructor who is completely familiar with all aspects of the aircraft's behaviour, particularly during fully developed spin recovery.

None of the above should deter a potential purchaser or pilot of a Yak-52. The aircraft has a superb safety record despite being used by a huge variety of organisations and people throughout the world. However like any aircraft it must be flown correctly. Recovery from simple power-off 'competition-type' one or two turn spins is conventional and rapid. All the above only refers to established flat spins and is why proper instruction should be mandatory for any aerobatic pilots on Yak-52s.

Richard Goode