AERONAUTICAL INFORMATION CIRCULAR P 139/2019

UNITED KINGDOM

UK Aeronautical Information Services
NATS Swanwick
Room 3115, Sopwith Way
Southampton SO31 7AY
aissupervisor@nats.co.uk
http://www.ais.org.uk
01293-573486 (Content – SARG Future Safety)
0191-203 2329 (Distribution - Communisis UK)

Date Of Publication
19 Dec 2019

Subject
Safety

Cancellation
P100/2005

PROPELLER FEATHERING ON TWIN PISTON ENGINE AEROPLANES

1 Most feathering propellers (hydraulically actuated constant speed, such as some Hartzell and McCauley types) fitted to twin piston engine light aeroplanes are designed in such a way that it is not possible to feather the blades below a certain low RPM (typically 700 to 1000 RPM).

2 This is because at these low RPMs, centrifugal latches operate to hold the blades in fine pitch to ensure that when the engine is shut down on the ground, the subsequent restart is not made with the propellers feathered.

3 In cases where the normal windmilling RPM at low airspeed may fall low enough to prevent feathering, the Flight Manual, Owner's Handbook, or Pilot's Operating Handbook warns the pilot that feathering cannot be accomplished below a certain RPM. However, the full implications of the situation may not always be clear, and other factors of which a pilot should be aware are:

a) In the event of an engine failure caused by a major mechanical fault (e.g. seizing bearings due to loss of oil), the rate of deceleration of the engine can be rapid and it is thus imperative that the pilot takes immediate action to feather the propeller, before the RPM falls to the 1000 RPM region;

b) On most twins, the usual procedure when shutting down an engine which has failed is initially to close the throttle of the inoperative engine. This serves to confirm which engine has failed before commencing the feathering actions. However, if the windmilling RPM has reduced towards the critical region where feathering may not be successful, then re-opening the throttle will usually increase the RPM slightly and improve the probability of being able to feather;

c) In the event of an engine failure, it is important not to let the airspeed reduce below the scheduled engine out climb speed. This will help to ensure that the propeller continues to windmill at sufficiently high RPM for feathering to be successful. If optimum performance is required it is vital to achieve and maintain this best engine out climb speed; and

d) The loss of performance associated with a stopped propeller in fine pitch or more importantly with a windmilling propeller is potentially serious. The additional drag will considerably reduce the single engine climb performance from that available with a fully feathered propeller. The directional controllability will also be reduced, though adequate control should still be available down to the minimum control speed (VMCA) as VMCA is determined with the propeller in the condition existing before feathering by the pilot (ie normally with a windmilling propeller). It will probably not be possible to trim the aircraft on the rudder trim at the best rate of climb speed and a considerable foot force may have to be held to maintain heading. However, it cannot be over emphasised that, if it is necessary to gain or conserve altitude the best available performance is essential, and for this the best engine out rate of climb speed must be maintained.