Irish Gliding and Soaring Association

Test Flight Procedure

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Test Flight Procedure

1. Introduction

Glider test flights are carried out subsequent to an annual inspection or major repair and are flown to ensure that the glider handling characteristics are normal for the type.
This document specifies who may carry out test flights, the precautions and checks to be undertaken before the flight takes place, which flight characteristics are to be checked throughout the course of the flight, and post-flight considerations.

2. Pilot Authorisation

Only Instructors with a minimum Class 2 rating , or pilot-owners specifically briefed by an instructor may carry out test flights.

3. Pre-Flight

Once the annual inspection or major repair has been completed, check that the MRF (Form 105) has been completed by the inspector responsible for the work. The inspector should brief the pilot about the nature of the maintenance work or repairs which had taken place.

A daily inspection should be performed.

A parachute must be worn for all evaluation flights.

The pilot should check that the canopy jettison mechanism is functioning correctly.

Check the weight and balance schedule, particularly if additional weights are required to facilitate spin checks (e.g. K21).

Check the airspeed and g-loading limitations for the glider, in particular, V_{ne}, V_a and V_b.

The pilot must be aware of things which can go wrong on an evaluation flight. As always, a pilot who is prepared for an emergency has a much greater chance of dealing with it successfully.

Things which have gone wrong include:

1. Control system reversal
2. Premature cable release
3. Vibration and flutter caused by slack cable control systems, loose hinges, loose bolts, incorrect control surface balance, etc.,
4. Poor control effectiveness due to incorrect control deflections or missing gap tape,
5. No ASI indication due to covers left on, plumbing incorrectly fitted, holes drilled through plumbing, etc.,
6. No altimeter reading due to covers or plugs still in place,
7. The glider does not fly straight due to mis-rigged controls or poor repair,
8. Lack of stability due to errors in the weight and balance calculations (CG too far aft)
9. Inability to flare due to errors in the weight and balance calculations (CG too far forward)
10. Structural failure due to defects missed during the inspection,

4. The Flight

The following procedures should be followed during test flights. The order of these tests is important as discovering a flutter problem part way through a spin recovery might be rather unpleasant. The pilot should have assessed that the glider is functioning correctly, particularly the ASI, before commencing the V_{ne} run.

Functional Check

Once airborne, the first step is to ensure that the glider is functioning correctly. The following items should be checked:

1. Aircraft controllable,
2. Instruments operating correctly,
3. Undercarraige operation,
4. Flap operation,
5. Airbrake operation.

General Handling

Examine the handling characteristics by flying straight and level and observing for:

Slip or skid,
Uncommanded roll or turn

Gently turn in each direction, paying attention to control co-ordination and controllability.

Run to V_{ne}

Increase the speed in 10 knot intervals up to max. manoeuvring speed, then in 5 knot intervals up to V_{ne}. At each speed, check the handling. If the air is turbulent, do not exceed the maximum rough airspeed limit.

Observe the following:

1. Vibration or snatching of the controls
2. Excessive control movements or forces
3. Any unusual or unexpected noise or creaking
4. Oscillations in pitch or yaw
5. Any abnormal structural deformations or movement

If any problems are encountered slow down immediately. Flutter becomes worse with increasing airspeed.

Stall

Perform a HASAL check. The glider should be flown at it's minimum airspeed with the wings level and no slip or skid applied. Pull the control column smoothly back to lower the airspeed by 1 knot per second until the stall is reached. Recover in the normal way.

Observe the following:

1. The indicated minimum or stall speed,
2. Aileron control during the stall,
3. Stall buffet,
4. Wing drop & tendency to spin,
5. Any difficulty in recovering,
6. Height loss.

Spin

Only perform this manoeuvre on gliders which are cleared for spinning.

Perform a HASAL check. For an effective spin entry, enter a turn at normal circling speed but stop the bank at about 10°. Smoothly apply an increasing amount of rudder, at the same time maintaining a constant nose attitude by progressive back stick movement. Allow the bank to increase - do not "hold off bank" by crossing the controls. Keeping the stick central usually works best. The spin will occur from about 40° bank angle. Provided the glider is capable of spinning, (i.e. it is rigged correctly and is within it's CG limits), this method is usually successful.

Recover the spin using the standard procedure.

Observe the following:

1. The motion of the glider during spin entry and recovery,
2. The maximum speed during recovery,
3. The height loss.

Repeat the above in the opposite direction.

Pitch Stability

Trim the glider at about 1.4 times the stall speed. If there is no trimmer fitted, note the trim speed. Gently increase the speed by 20% and slowly relax the pressure on the control column. Note the speed that the glider returns to.

Repeat the procedure, this time decreasing the speed by 20%.

On easing the pressure on the control column, the speed should immediately return towards the trim speed. On some types, the speed will oscillate around the trim speed pitching nose up and nose down every 20-30 seconds or so. Provided this can be controlled, it is not a problem.

Adjust the trimmer to achieve the maximum and minimum trim speeds.

Turn Stability

Fly the glider in both left and right hand turns at 30° angle of bank. Reduce the speed gently until the minimum flying speed is reached. Complete several full orbits.

Observe the following:

1. Minimum speed for a steady turn
2. Any control difficulty
3. Any abnormal control forces, including aileron reversal
4. Position of controls in the turn
5. Response to small control movements.

5. Post Flight

If the test flight is satisfactory, complete the MRF Form.
If the test flight is unsatisfactory, brief the inspector and the owner on the fault(s) found.