

AIRWORTHINESS BRANCH
AIR TRANSPORT DIVISION - MINISTRY OF TRANSPORT
ENGINEERING INSTRUCTION

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AGRICULTURAL AIRCRAFT - RULINGS

1. Agricultural Overload Certification:

The following rulings apply in respect of the approval of maximum take off weights for agricultural flight which exceed the normal maximum weights:

- (a) If the US type certificated restricted category weight equals or exceeds the NZ agricultural maximum weights then no handling tests are needed for those certifications to which the US restricted category certification applies. However, note the following:
 - (i) US restricted category certification only normally applies when spray or dispersal gear is attached. This may mean the common NZ configuration with hopper box only fitted has not been checked against handling requirements at the higher weight. In that case some handling checks will be required, though these may be minimal if examination of flight test reports shows there to be no doubts as to handling qualities for the other configuration at the higher weight and for the bare aeroplane at the normal weight.
 - (ii) The load factor quoted in US Operator Manuals etc., as appropriate for US restricted category, may be lower than the 3.0 g usually associated with the NZ agricultural weight. As this lower load factor may have been used for stressing dispersal equipment and hopper attachments it should be prescribed in the flight manual as the load factor limitation associated with the NZ agricultural weight.
 - (iii) Where for the US restricted category certification a reduced V_{NE} is prescribed it shall not be exceeded by the V_{NE} prescribed for NZ operations in excess of the normal maximum weight or for operating where the US dispersal gear is used unless a higher V_{NE} is separately substantiated. (also see (b)).
- (b) V_{NE} for aircraft weight exceeding the normal certificated weight is to be reduced so that loads associated with aft movement of the wing CP with increased airspeed are not greater than the loads at

normal certificated weight. In the absence of other data reduce V_{NE} by the same proportion as the weight is increased.

- (c) Spinning trials will not be required for agricultural maximum weight certification provided the stall characteristics are such that an inadvertant spin is unlikely (Ref: Piper PA-36 restricted category certification).
- (d) A C.G. envelope at agricultural weight unless otherwise substantiated is obtained by extending the fore and aft limit lines of the envelope up to the agricultural weight line. C.G. envelopes approved in the US for restricted category may be adopted for the NZ agricultural weight for the configurations for which the US restricted category applies. If an examination of the substantiating data shows it to be reasonable the US restricted category envelope may also be used for other configurations e.g. NZ hopper box.

2. Loader Driver Seat Modification:

- (a) Loader driver seats situated next to the pilot should be fitted with a shoulder harness.
- (b) For loader driver seats situated next to the pilot the pilot must be able to obtain full control movement (for other than hopper controls), read all instruments and have a view not significantly obstructed when persons of at least average height and build are seated in the pilot's and loader driver's seats with harnesses properly secured. For the purposes of this check the pilot and loader driver must be seated in comfortable positions which are not difficult to maintain and are not likely to encourage flight with loosened or disconnected safety harness. Unless the above requirement is not met for a wide range of size and build combinations of pilot and passenger a placard is required to be displayed in full view of the pilot, worded as follows:

" BEFORE FLIGHT WITH PASSENGER, CHECK
FOR UNOBSTRUCTED MOVEMENT OF CONTROLS "

- (c) Loader driver seat modifications must be checked to ensure that for reasonable loading configurations the CG limitations can be complied with. For a Cessna Agwagon modification a placard was prescribed to require ballast in the luggage compartment when a loader-driver is carried. This will not be acceptable for future loader driver modifications. A Flight Manual statement and/or placard may be required in appropriate circumstances to point out care must be exercised to ensure CG limitations are complied with.

3. Hopper Load Limitations:

The Flight Manual is to state the maximum structural hopper load and is to require a placard stating the maximum hopper load calculated for the particular aircraft. See Flight Manual AIR 134 paragraph 2.4 for appropriate wording.

4. Detachable Equipment:

Detachable equipment such as spreaders and spray equipment are to have a permanent label attached stating the modification number, aircraft types and models to which it may be fitted and the applicable Flight Manual Supplement. The FMS is to state whether pilot fitment is permitted.

5. Performance Testing of Modified Aircraft:

Because agricultural aircraft operate primarily in the no third party risk situation it is not considered cost effective to require the complete range of performance testing. Where a modification is embodied which could affect the aircraft's performance the following considerations will apply:

- (a) Measurement of take-off distances will not be required. In the case of a third party risk being present an arbitrary factor of 1.5 must be applied to the required take-off distance for the standard configuration, unless a rational analysis can substantiate a less conservative value. (For example by a comparison of climb performance.) If the modification results in a performance reduction the Flight Manual Supplement must contain a statement along the following lines:

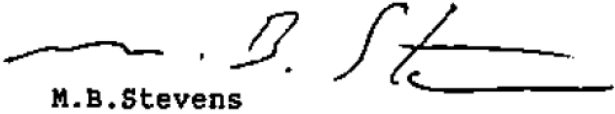
" TAKE-OFF DISTANCE REQUIRED

Take-off distance is greater than that required for the standard configuration in the given conditions.

If a third party risk is present take-off distance required must be assumed to be [X] % of that given by Figure [Y]. "

Where: X = 150 unless a rational analysis can substantiate a different value.
Y = the standard performance chart with third party risk factors. "

- (b) The pilot must be provided with some measure of the effect of the modification on climb performance. The weights, altitudes and temperatures (up to 4000 ft. density altitude) at which a 6% climb gradient can be achieved must be determined by flight test and provided in suitable tabular or graphical form in the Flight Manual Supplement. Unless a propeller cropped to the minimum allowable diameter is used for the climb tests a conservative factor must be applied to the results to allow for cropping.


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