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TANZANIA CIVIL AVIATION AUTHORITY
Aeronautical Information Services

AERONAUTICAL INFORMATION CIRCULAR

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This following circular is hereby promulgated for information, guidance and necessary action.

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Director General

THE EFFECT OF ICING ON PISTON ENGINES IN LIGHT AIRCRAFT.

1. The following information has been extracted from a recent United Kingdom Board of Trade Aeronautical Information Circular.

2. In certain meteorological conditions, all piston engines are liable to be affected by icing in the induction system. In engines fitted with carburettors, this icing can occur in conditions of high humidity at small throttle openings, even on warm days. With engines employing fuel injection systems, impact icing of the pressure sensing tubes may occur when flying in cloud at low temperatures. Both these conditions can result in a loss of power, or in power not being available when needed, unless precautionary measures are taken.

3. The following notes are intended as a general guide to assist pilots to avoid engine icing , but reference should also be made to the engine constructor's Operating Manual and Service Bulletins for specific drills related to a particular engine type.

4. CARBURETTOR ICING:

4.1 Carburettor icing can occur during taxiing with small throttle settings, or when engine is idling.

4.2 With a fixed pitch propeller, a drop in RPM can be a good indication of carburettor icing, but with a constant speed propeller, the loss of power could be serious before a drop in RPM occurs. A more positive indication would be a drop in manifold pressure, or loss of air - speed in level flight.

4.3 Other than on take-off, hot air should be selected whenever a drop in RPM or manifold pressure is experienced, when icing conditions are suspected and when flying in conditions of high humidity with the out- side air temperature within the range mentioned in para.4.7, unless expressly permitted in the instruction issued by the manufacture, the continuous use of hot air should be avoided. It should be selected for sufficient periods of time to restore the engine power to the original level. If a loss of power is due to icing, and the use of hot air disperses it, re-selection of cold air should produce an increase in RPM or manifold pressure over the original reading. This is a useful check to see whether ice is forming. If it is, keep an eye on the engine instruments as it may recur. It

should be noted that on the other hand, if ice is not forming when the cold air intake is in use, changing to the heated intake will cause a significant loss of power, and increase in specific fuel consumption and no increase in RPM, or manifold pressure, beyond those obtained prior to the use of hot air, will be indicated when cold air is re-selected.

NOTE: The use of hot air when ice is already present may temporarily make the situation appear worse, because of an increase in rough running. If this happens, the temptation to return to cold air should be resisted in order that the hot air may have time to clear the ice.

If no intake temperature gauge is fitted, partial hot air should not be used. The system should be either fully ON or OFF. Partial heat can cause carburettor icing because it may melt ice particles (which would otherwise pass into the engine without causing trouble) but not prevent the resultant moisture freezing when it passes through the carburettor.

4.4 Just prior to take-off, check that the induction hot air system is working correctly, i.e. check that there is a drop in power (RPM or manifold pressure) when hot air is selected, and that the power is regained when cold air is re-selected. Check that the full throttle RPM and manifold pressure are correct for the particular aircraft type. The RPM with a fixed pitch propeller will be less than the maximum RPM approved for the engine, but the relevant value should be known for each aeroplane. Check manifold pressure and RPM in the climb and frequently during cruise and select hot air if icing is suspected.

4.5 During let down, and approach to landing, owing to the small throttle settings, carburettor icing is possible, particularly in conditions of high humidity. The heat for the hot air system is derived from the engine which must, therefore, be kept warm by opening the throttle if necessary, if the system is to be effective.

4.6 It is important to remember that high relative humidity is one of the prime factors in carburettor icing and Tanzania is an area where high humidity frequently occur. Pilots should therefore be constantly alert for the possibility of carburettor icing, and take the necessary corrective action before an irretrievable situation arises. Remember, if you have an engine failure due to carburettor icing, the engine may not restart. Even if it does, there may well be delay which could be critical.

4.7 It should be noted particularly that carburettor icing does not occur only in cold weather. As mentioned in para. 2 it can happen on warm days if the humidity is high (i.e. of the order of 60 per cent or more) and is then likely whenever the outside air temperature is within the range of 5^0 C (41^0 F) to 27^0 C (81^o F). It can, in fact, occur at almost any air temperature IF THE HUMIDITY IS HIGH.

5 FUEL INJECTION ICING

5.1 Fuel injectors may not be subject to high humidity icing, as are carburettors, but they may be subject to impact when flying in cloud at low temperatures; under these conditions hot air should be selected.

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