

Federal Aviation Agency



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SUBJECT : AIRFRAME ANTI-ICING SYSTEM FOR VISCOUNT AIRCRAFT

1. **PURPOSE.** This circular is to disseminate information regarding anti-icing tests on the Viscount aircraft and to emphasize the importance of complying with the anti-icing procedures in the approved Airplane Flight Manual.
2. **BACKGROUND.** As a result of several Viscount accidents, the effects of airframe icing was investigated by Vickers-Armstrongs. Pending results of the investigation, Vickers sent cables to all operators of Viscount aircraft on April 16, 1963, emphasizing that the airframe anti-icing system should be selected on whenever icing conditions are anticipated or encountered. On May 13, 1963, Vickers sent cables to all Viscount operators which advised that a flight manual change would be issued, requiring both heat exchangers to be on at all times when the indicated outside air temperature is plus 10 degrees Centigrade or below. On May 23, 1963, the Federal Aviation Agency further emphasized the use of airframe anti-icing in dispatches to Viscount operators and requested that flight crews be informed.

Vickers-Armstrongs completed their investigation of airframe icing and issued a report, dated August 23, 1963, titled, "An Investigation of the Behavior of Viscount Aircraft in Severe Icing Conditions."

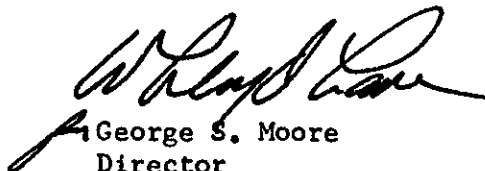
This report states that, "The overall conclusions from the investigation are as follows:

- (a) Horn type ice formations can be produced on the leading edge of an unheated aerofoil in the ambient temperature range - 5° to - 10° C. In this temperature range, it was found from the icing tunnel tests that the time required to produce a large amount of horn-type ice (horn lengths of about 1½") is about 20 minutes with the Continuous Maximum liquid water concentration specified by B.C.A.R., or 10 minutes with twice this concentration.

- (b) Horn-type ice of the above magnitude on the tailplane leading edge can have severe effects on the handling characteristics of any aircraft (underline supplied) under conditions where a large incidence is obtained on the tailplane. The investigation has not revealed any particular aspect in which the Viscount is unusually critical in this respect and in principle it is considered that the Viscount would exhibit similar characteristics to other types of aircraft of the same generation.
- (c) The performance of the Viscount tailplane anti-icing system has been demonstrated to be adequate to prevent the formation of horn-type ice or to shed the ice if it has been allowed to form due to a late selection of the anti-icing system.
- (d) Whilst the use of the anti-icing system will maintain the leading edge free from ice buildup even under severe conditions, some runback ice may form but it has been demonstrated that this type of ice has a negligible effect on handling characteristics.
- (e) The effect on the handling characteristics of the ice buildup which would be produced in five minutes with three times B.C.A.R. Continuous Maximum liquid water concentration was investigated and found to be negligible. It is considered that this case adequately covers an unsuspected encounter of extreme severity."

The investigation further disclosed that if horn-type ice builds up sufficiently on the leading edge of the stabilizer, an uncontrollable pitchover can occur with a change in the angle of attack.

3. ACTION. The importance of insuring that the airframe anti-icing is turned on whenever the outside air temperature is plus 10°C or below is apparent from the result of the icing tests. The importance of complying with airframe anti-icing procedures should be emphasized during training and proficiency checks by instructors, air carrier check pilots, and FAA inspectors.


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