AIRWORTHINESS NOTICE

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Microbiological Contamination of Fuel Tanks of Turbine Engine Aircraft

1. Introduction:

1.1 Reports have been received that aircraft regularly operating in climatic conditions such as those prevailing between the latitude 300 South have been contaminated in the fuel tanks by fungus. Another aircraft regularly operating from the United Kingdom, was found to have localised areas of heavy growth when inspected after standing in a heated hangar for two months with fuel in the tanks. It is considered that the storage conditions were a contributory factor.

1.2 In one case contamination was found during an investigation into the cause of erratic fuel contents indication, when white crusty deposits and brown stains were seen on the probes. Further examination revealed the presence of brown/black shines adhering to horizontal upward facing surfaces within the tanks. Examination by the Commonwealth Mycological Institute, Kew, confirmed that this substance was a fungal growth of the type Cladesporium Resinae.

2. Effects of Contamination:

2 1 The problems associated with microbiological growths have been known for some years and research into their behavior has been conducted throughout the world. In the case of Cladesporium Resinae, the spores of the fungus can exist in a dormant state in Kerosene fuels in most parts of the world. These will only develop when in contact with water in fuel at temperatures such as those reached when the aircraft or storage tanks arc exposed to a warm ambient temperature such as radiation from the sun or for long periods in a heated hangar. If developing fungus forms on water not drained off and which adheres to the tank surfaces, the fungus is able to absorb water later introduced with fuel or condensing following a cold soak.

2.2 Where fungus has formed there is a probability that corrosion will occur. Corrosion has been found where fungus had formed on the bottom tank skin, on the chordal support member in the wing root and on fuel pipes within fluel tank. In some cases aircraft have been sufficiently affected to necessitate replacement of some component parts.

2.3 The fungus itself if dislodged by fuel during refuelling can obstruct fuel filters.

3. Inspection:

3.1 Operators uplifting fuel or operating regularly in areas of high normal ambient temperatures and high humidity or where ftungus development is known to have been encountered, are advised to scrutinise tank areas for signs of fungus whenever access is gained for any purpose. It is further recommended that, for aircraft operating under these conditions, maintenance schedules should be amended to include a visual internal tank check at periods

prescribed by the aircraft constructor. It is also important, whenever fuel tanks are inspected, to ensure that all passage ways between rib cleats etc.., are not obstructed, so that

a drainage path for water is maintained at all times. If the aircraft has been standing in a heated hangar for prolonged periods the fuel in the tanks should be treated with a brocade (see paragraph 4).

3.2 If contents gauges give suspect indications, immediate consideration should be given to the possibility that tank probes may be contaminated with water/or fungus and appropriate inspections should be carried out.

3.3 Whenever fuel filters are checked they should be closely examined for the presence of shines of any colour.

3.4 The need to prevent water collection by good maintenance practices and control of fuel supplies is emphasized. A high degree of protection can be maintained by strict adherence to water drain checks before and after refuelling and, if the aircraft has been standing for any length of time, again before the next flight. Fuel quality control checks should be vigorously applied.

4. **Treatment:**

4.1 If fungus is discovered, the fuel system should be cleaned as soon as possible by a method approved by the aircraft constructor and the engine manufacturer

4.2 It must be appreciated that if the fungus is allowed to develop, cleaning and rectification could become a major operation involving grounding of the aircraft for a long period.

4.2.1 It is strongly recommended that when aircraft operate in an area where fungal growth can be encountered, or where there is any possibility of temperatures in the fuel tanks frequently rising above 20^{o} C . a fungicide additive should be used in the fuel as approved by the aircraft constructor and the engine manufacturer. (For example, Rolls Royce have approved the use of Biobor J. F or Methyl Cellosolve). To be effective Methyl Cello solve must be used regularly British Aircraft Corporation recommend that for BAC One-eleven aircraft fuel treated with Methyl Cello solve should be uplifted at least once every 24 hours

Biobor J, F. however, can be used intermittently. Treatment with fuel containing Biobor 3. F. over a period of 72 hours should remain effective for as long as three months. It is emphasized that the frequency of treatment and the dilutions prescribed by the aircraft constructor and the engine manufacturer must be adhered to. Introduction of an unapproved fungicide or inhibitor may jeopardize the safe operation of the aircraft.

CANCELLATION:- This issue cancels all previous issues of Notice No. 20 which should be destroyed.

For/ Director General
Civil Aviation Authority