

following runway touchdown) to the neutral (engage) position was necessary before engagement could be made. Therefore, the flight control push rods were burned and melted by fire originating from the left-hand battery between the time the aircraft was turned from the landing runway and the time the captain assisted himself out of his seat by pulling on the locked control yoke. The elapsed time between these two occurrences was approximately 2 minutes, which attests to the extreme intensity of the battery fire.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was an undetected electrical short within the left nickel-cadmium aircraft battery, which resulted in the absorption of an increasing amount of heat energy over an unknown period of time and progressed to a state of thermal runaway.

CORRECTIVE ACTION

This accident is the most recent in a series of nickel-cadmium battery fires which the National Transportation Safety Board has investigated. As a result of this and the previous similar accidents, the Board continues an in-depth involvement in a National Bureau of Standards program aimed at an analysis of these battery failures with a view toward a discovery of the failure mechanism.

Coordinated efforts by the Board and the Federal Aviation Administration resulted in the issuance of Airworthiness Directive 71-21-5, applicable to the operators of turbine-powered aircraft having a primary electrical system that includes a nickel-cadmium battery containing any polystyrene cell cases. This Airworthiness Directive requires the continued periodic inspection of all in service batteries for evidence of heat damage until such time as the listed battery changes are effected. The required battery changes must be complied with prior to April 15, 1972, or prior to a specified in service time, depending upon the rated ampere hour capacity of the battery. The Federal Aviation Administration also issued Advisory Circular AC 00-33, dated August 26, 1971, subject: "Nickel-Cadmium Battery Operational, Maintenance, and Overhaul Practices." This circular provides guidelines for more reliable nickel-cadmium battery operation through sound operational and maintenance practices.

As a result of this and other fires which have occurred aboard Viscount aircraft, the British Aircraft Corporation of England is contemplating issuing engineering changes on the subject of Fire Precaution Modifications to the Underfloor in the Electric Bay Region for all Viscount series aircraft. Pending the finalization of such engineering changes,

the Board recommends that the Federal Aviation Administration issue an Airworthiness Directive to require accomplishment of the following items by operators of U. S. registered Viscount aircraft.

1. Install steel flight control push rods in the electrical compartment area.
2. Shield the electrical components in the aft section of the electrical compartment.
3. Attach aluminum reflector material to the underside of the cabin floor in the electrical compartment area.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ OSCAR M. LAUREL
Member

/s/ FRANCIS H. McADAMS
Member

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Member

/s/ ISABELL A. BURGESS
Member

December 29, 1971