

and steel clevis assemblies could be manufactured to permit earlier replacement. Consequently, the FAA issued Amendment 30-1254 to AD 71-9-2, on August 3, 1971, requiring that all unmodified 7079-T6 fittings be replaced or modified before further flight after January 1, 1972.

The Safety Board believes that the revised inspection requirements and earlier replacement date will significantly reduce the possibility of similar failures of the rudder actuator support fitting on B-707/720 aircraft.

However, in view of the known or suspected susceptibility of existing aircraft structural members and components to stress-corrosion cracking, the Safety Board recommends that:

1. The Air Transport Association, National Air Transportation Conferences, the Aerospace Industries Association, the General Aviation Manufacturers Association, and the Federal Aviation Administration re-emphasize the need for continuous vigilance in maintaining the structural integrity of existing aircraft components that are made of materials known to be, or suspected of being, susceptible to stress-corrosion cracking.

Although Boeing's Service Bulletins conform to the standardized format set forth in ATA Specification No. 100, the Safety Board believes that Service Bulletins (particularly Alert Service Bulletins) which affect critical safety of flight items should contain information regarding the potential operational hazards related to the item. For instance, with respect to SB 2903, a clearly delineated and conspicuous warning that failure of the support fitting would result in the complete loss of left rudder control would have alerted operators that more was involved than equipment improvement. Consequently, the Safety Board recommends that:

2. The Air Transport Association, the General Aviation Manufacturers Association, operators, and manufacturers of aircraft, airframes, accessories and components, revise present Service Bulletin (particularly

Alert Service Bulletin) formats and procedures to insure that definitive information on the problem is provided therein, including a conspicuous warning of the potential operational hazards involved.

Likewise, when the FAA issues an Airworthiness Directive that affects a critical flight safety item, it should contain information on the potential operational hazards involved. In this instance, it appears that operations and engineering specialists did not recognize that a dangerous situation could occur if fitting failure occurred under certain flight conditions. Also, the amendments to AD 69-13-2 did not apprise the operators of the potential hazards associative to in-flight failure of the fitting. Although there were no requirements for the inclusion of such information, the Board believes that AD's should contain a conspicuous warning of the potential operational hazards associated with the subject matter of the AD.

Consequently, the National Transportation Safety Board recommends to the Administrator of the Federal Aviation Administration that:

3. Airworthiness Directive formats and procedures be revised to include information and conspicuous warnings of the potential hazards associated with the subject matter of the directive. An acceptable alternative would be the concurrent release of an Operational Alert Notice containing similar information.

Because aircraft performance must frequently be determined solely by reference to flight instruments, the Safety Board believes that additional emphasis should be placed on the determination of performance and necessary corrective action when the aircraft becomes involved in abnormal regimes of flight or unusual attitudes. Moreover, since these situations are encountered infrequently in-flight, pilots lack familiarity with aircraft performance therein and are hard pressed to cope with the situation when encountered unexpectedly. Sometimes, they are unable to do so successfully.

Obviously, it is not safe to practice these types of maneuvers in transport aircraft, and the simulator appears to be the best solution. However, to achieve the desired degree of effectiveness, the simulators must be capable of realistically duplicating aircraft performance in abnormal flight regimes and unusual attitudes, and a training program must be established. Consequently, the Safety Board again recommends to the Administrator of the Federal Aviation Administration²⁰ that:

152 4. 14 CFR 61, Appendix A, and 14 CFR 121, Appendices E and F be amended to include a requirement for pilots to demonstrate their ability to recover from abnormal regimes of flight and unusual attitudes solely by reference to flight instruments. For maximum safety, these demonstrations should be conducted in an appropriate flight simulator. Should existing or proposed simulators be incapable of realistically duplicating aircraft performance in the regimes of flight beyond normal operation, it is further recommended that the FAA take appropriate measures to require that such existing or proposed simulators be replaced or modified to include such a capability.

The Safety Board also recommends to the Administrator that:

153 5. The FAA review all air carrier pilot training programs to insure that adequate information is made available to the pilots on which to base: (1) a comprehension of the sideslip-roll coupling effects in sweptwing aircraft, and (2) considerations for the use of the thrust reduction method of symmetrizing thrust to overcome directional control problems.

²⁰A similar recommendation was made in May 1970; however, the FAA did not concur in our recommendation

As a consequence of several similar training accidents in the past, the Safety Board made several recommendations to the Administrator. Those recommendations, for the most part, received favorable consideration; however, due to interim advancement in the design of flight simulation devices, the Safety Board again recommends to the Administrator that:

154 6. All maneuvers requiring engine(s) -out operation of the aircraft close to the ground be conducted, to the maximum extent possible, in appropriate flight simulation devices. For those engine(s) -out maneuvers which the Administrator determines must be performed in flight, the Board further recommends that consideration be given to their performance at altitudes that will insure ample margins of safety in the event that unexpected aircraft emergencies are encountered.

The Safety Board believes that if Western Air Lines had had a flight safety officer at an appropriate level in their organizational structure, the full extent of the support fitting problem quite probably would have been brought to the attention of those responsible for implementing corrective actions. As it was, the appropriate maintenance, engineering and operations personnel apparently never assembled all of the necessary information from which the extent of the problem could have become known. This is one of the functions that a flight safety office is designed to accomplish.

Therefore, the Safety Board recommends that:

155 7. The Air Transport Association and the National Air Transportation Conferences study the desirability of establishing flight safety offices in each member organization, and make this a subject of discussion with the association's membership at the earliest opportunity.