

Debonding Problems

Some hot, humid operating environments may be contributing to the degradation of adhesive bond joints in Robinson Helicopter rotor blades, and new testing methods are required to ensure the detection of separation at bond joints, the U.S. National Transportation Safety Board (NTSB) says.

The NTSB said that examination of rotor blades from helicopters involved in several recent accidents indicates that “debonding (separation) of the rotor blade skin ... led to fracture of the rotor blade.”

In each instance, the debonding occurred before the rotor blade achieved its retirement life of 2,200 operating hours or 12 years, the NTSB said, adding that it was concerned that “certification testing and inspection methods currently used by manufacturers may not be adequate to ensure the durability of the rotor blade, particularly in severe environments.”

Typically, the inspection of adhesive joints on Robinson main rotor blades involves the tap test method in which the surface of an adhesive joint is tapped with a small hammer or a coin while the person conducting the inspection listens for changes in pitch that indicate defects.

The accidents included the Oct. 11, 2006, in-flight breakup of an R44 over the Dominican Republic in which four people were killed; the Dec. 5, 2006, in-flight breakup of an R44 off the coast of the Fiji Islands in which the pilot was killed; and a March 15, 2007, incident of severe vibration in an R22 in Australia that ended without injury to the crew. In another accident — a March 4, 2006, in-flight breakup of an R22 along the New Zealand coast that killed two people — the rotor blade “showed bond joint fracture features consistent with a degraded bond,” the NTSB said.

“Adhesive bond joints are likely to degrade with time when subjected to harsh environments, such as the high humidity and high temperatures typically found at or near the sea, and ... tap



Australian Transport Safety Bureau

testing of the main rotor blades is not adequate for consistently detecting debond at the skin-to-spar and skin-to-tip cap bond areas,” the NTSB said. “Consequently, separation at bond joints could remain undetected and lead to in-flight separation of the main rotor blade skin and possible loss of control.”

The NTSB recommendations to the U.S. Federal Aviation Administration (FAA) included calls for the FAA to revise advisory circulars to “include long-term durability testing of adhesive bond joints for helicopter blades”; amend an airworthiness directive to require that main rotor blades be inspected “for cracks in the paint layer at the skin-to-spar bond line” and that any blades with such cracks be removed from service; require Robinson to develop a nondestructive testing technique to detect bonding defects and require this technique to be used in inspections of all Robinson main rotor blades; and determine if sufficient tests and inspections of adhesive bonds are in place for blades manufactured by other companies.

Turn on the Lights

Despite the widely held belief that aircraft external lights could be effective in preventing runway incursions, uniform procedures do not exist worldwide governing the use of external lights while on the ground, the International Federation of Air Line Pilots’ Associations (IFALPA) says.

Working together, IFALPA, Eurocontrol and the U.S. Federal Aviation Administration have developed guidelines intended to improve the visibility of aircraft within the maneuvering area of an airport. The guidelines — which discuss lighting procedures to be used before starting an aircraft, during taxi out, while crossing a runway, while entering a runway for takeoff and during taxi in — are not intended to replace proper communications.

IFALPA said that, regardless of the guidelines, the aircraft captain is “responsible for ensuring [that] operating limitations



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and established operating procedures are observed. The captain always has the final authority to use the aircraft lights as deemed necessary for the safe execution of flight, including ground movement operations.”

Emergency Procedures

Manufacturers of aircraft with engine turbochargers should be required to amend the emergency procedures sections of pilot operating handbooks and airplane flight manuals to include information on turbocharger failure, the U.S. National Transportation Safety Board (NTSB) says.

In a safety recommendation to the U.S. Federal Aviation Administration, the NTSB said that it was especially concerned about including procedures that would minimize the hazards of in-flight fires and/or engine power loss.

The NTSB cited a fatal May 24, 2004, accident in which a Cessna T206H, operated by the U.S. Drug Enforcement Agency, crashed after the pilot reported losing engine power in cruise flight 1,150 ft above ground level. The pilot, the only person in the airplane, was killed in the crash, and the airplane was destroyed.

During its investigation, the NTSB found that the turbocharger had failed and the turbine wheel had seized. The in-flight emergency procedures included in the pilot operating handbook “lacked information to assess the difference between an engine [failure] and a turbocharger failure and did not provide any clear guidance or instructions on how to handle a

turbocharger failure once a pilot identified the problem,” the NTSB said.

The NTSB said the probable causes of the accident were “the seized turbocharger, the altitude/clearance not maintained/obtained during approach to a forced landing on an agricultural field and the unsuitable landing area encountered by the pilot.” The NTSB cited “inadequate emergency procedures by the manufacturer” as a contributing factor.



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Belgian accident investigators are searching for the cause of the May 25 crash of this Kalitta 747-200 during takeoff from Brussels for a flight to Bahrain. Witnesses reported hearing a loud bang just before the airplane ran off the runway and broke apart. None of the four people in the cargo airplane was injured.

Human Factors Standards

New requirements call for Australian pilots to be trained and assessed in “the practical application of human factors” for every flight.

The Civil Aviation Safety Authority (CASA) says the new human factors standards, which were introduced into pilot training for all licenses being issued beginning March 1, will be subject to formal skills assessment beginning July 1, 2009.

“The move recognizes the need for skills such as human performance and lookout, situation awareness, decision making, workload management and communications to be delivered through structured training,” CASA said.

Flight training organizations are being required to implement training methods that “ensure pilots meet the human factors standards,” CASA said.

757 Clip Inspections Urged

Operators of Boeing 757s should be required to conduct a one-time visual inspection of support beam clips on a portion of the upper wing to ensure that the clips are not cracked and that they are properly oriented, the U.S. National Transportation Safety Board (NTSB) says.

The NTSB cited a March 22 incident in which the left upper wing fixed trailing edge panel on a US Airways 757 separated at 27,000 ft while the airplane was en route from Orlando, Florida, U.S., to Philadelphia. The panel struck several airplane windows; the outer pane of one window cracked as a result. None of the 180 people in the airplane was injured in the incident.

A subsequent examination of the wing found fatigue cracks in three support clips; the maintenance technician who removed the clips said that they had been oriented incorrectly and that no spacers had been installed, as required by a 1988 Boeing service bulletin and a subsequent airworthiness directive from the U.S. Federal Aviation Administration (FAA).

After the incident, inspections of 18 other US Airways 757s revealed that a total of 11 clips on seven airplanes were cracked; of the 11, nine clips on five airplanes were oriented incorrectly. US Airways records did not indicate whether spacers had been installed.

The NTSB, noting that Boeing considers spacers critical in extending the fatigue life of the support clips, said that the cracked clips could have resulted from incorrect clip orientation, the age of the clips, the absence of spacers or a combination of these three issues.

The NTSB said it is “concerned that there may be other [757s] with cracked and/or improperly oriented clips or lack of spacers, which could lead to support clip failure and a wing fixed trailing edge panel that separates from the aircraft in flight could impact the tail of the airplane, resulting in the potential loss



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of controlled flight, or could damage the windows or fuselage, resulting in possible rapid depressurization of the aircraft.”

The NTSB recommended that the FAA require operators to conduct a one-time visual inspection of the clips and replace those that are cracked and reinstall those that are oriented improperly or that lack spacers. Other recommendations called for the FAA to require operators to report any cracked clips discovered in their inspections, as well as the part number and orientation of the clips and whether spacers were present, and to require Boeing to issue more explicit instructions for the correct orientation of the clips and spacers.

Unmanned Aircraft Join the Crowd

Eurocontrol says it has begun a program to safely integrate unmanned aircraft systems (UAS) into the pan-European air traffic management (ATM) network.

The current separation of UAS from manned aircraft has limited their use in “a wide range of activities that are particularly well suited to their unique mix of capabilities such as flexibility, agility, long endurance and low cost,” Eurocontrol said.

The agency said that to accomplish its goal, a strong partnership is needed with industry, operators and all airspace users.

“The challenge of UAS integration is global,” said Jean-Robert Cazarré, Eurocontrol’s director of civil-military coordination.

The Eurocontrol program will focus first on the integration of UAS into the ATM network in the short to medium term, within the framework of the existing ATM environment. The second phase of the program will address how UAS will be handled after 2020 under Single European Sky ATM Research (SESAR), which is intended to change the way air traffic is managed throughout Europe. Primary concerns are “the requirement for an effective sense-and-avoid system, and the need to ensure adequate radio spectrum for the additional avionics associated with UAS flight,” Eurocontrol said.



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In Other News ...

The U.S. Federal Aviation Administration (FAA) has ordered pilots and air traffic controllers to stop taking Chantix, an **anti-smoking medicine** that researchers say is associated with an increased risk of seizures, loss of consciousness, heart attacks, vision problems and psychiatric instabilities. ... The FAA is proposing to rewrite a 1960 regulation that allows aircraft to take off with **“polished frost”** on their flight surfaces. Decades of research have convinced the FAA and others that any amount of a contaminant — including smoothly polished frost — on critical surfaces “could be detrimental to the flight characteristics of an aircraft,” the FAA says.

Compiled and edited by Linda Werfelman.