

Coping With 'Core Lock'

The U.S. National Transportation Safety Board (NTSB), citing its continuing investigation of a 2004 accident in which a Bombardier CRJ200 crashed near Jefferson City, Missouri, U.S., has issued several safety recommendations regarding "core lock," a rare condition that can freeze an engine core after an in-flight flameout and prevent a windmill restart (see *Aviation Safety World*, July 2006, p. 44).

The captain and first officer — the only people in the airplane during the Oct. 14 Pinnacle Airlines (a subsidiary of Northwest Airlines) repositioning flight from Little Rock, Arkansas, to Minneapolis — were killed, and the airplane was destroyed.

The NTSB investigation has determined that the pilots tried unsuccessfully to restart the General Electric (GE) CF34-3 turbofan engines after a stall and dual-engine flameout at 41,000 ft. The flight crew attempted a windmill restart, which requires airspeed of at least 300 kt; recorded flight data showed that the maximum airspeed during the restart attempt was 236 kt. The core engine speed remained at zero during the attempted windmill restart and during subsequent restart attempts at 13,000 ft using the auxiliary power unit.

As a result of the investigation, NTSB said that the U.S. Federal Aviation Administration (FAA) should, for airplanes with CF34-1 or CF34-3

engines, "require manufacturers to perform high-power, high-altitude sudden engine shutdowns; determine the minimum airspeed required to maintain sufficient core rotation; and demonstrate that all methods of in-flight restart can be accomplished when this airspeed is maintained."

NTSB also recommended that FAA ensure that the flight manuals for CRJ100, 200 and 440 models and for other airplanes with CF34-1 or CF34-3 engines state the consequences of failing to maintain the minimum airspeed required for engine core rotation after a high-power, high-altitude sudden engine shutdown.

Other NTSB recommendations called for a review of the design of

other turbine engines to check for susceptibility to core lock. If engines are found to be susceptible, tests should be conducted to determine the minimum airspeeds required to maintain sufficient core rotation to enable an engine restart; the issue should be discussed in airplane flight manuals, NTSB said. If restart is impossible with a core rotation speed of zero, other design or operational means should be provided to enable flight crews to restart the engines. In addition, certification requirements should be established to "place upper limits on the value of the minimum airspeed required and the amount of altitude loss permitted for windmill restarts," NTSB said.



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NTSB Seeks Expanded CRM Training

Crew resource management (CRM) training should be required for on-demand operators that conduct dual-pilot operations, the U.S. National Transportation Safety Board (NTSB) said as it issued its annual "Most Wanted List of Safety Improvements."

"The [NTSB] has investigated several fatal aviation accidents involving Part 135 on-demand operators ... where the

carrier either did not have a CRM program or the CRM program was much less comprehensive than would be required for a Part 121 [air carriers and commercial operators] program," NTSB said.

NTSB said that although the U.S. Federal Aviation Administration (FAA) has agreed with the basic principles of the recommendation, "no discernable progress has been made."

Other Most Wanted items affecting aviation deal with runway incursions, flammable fuel/air vapors in fuel tanks, aircraft icing and the use of audio, data and video recorders to provide information to accident investigators.

The Most Wanted list was first issued in 1990; since then, it has been revised annually.

Steps Taken to Improve Emergency Communications

The evacuation of a Boeing 717-200 following an engine fire that broke out as the crew prepared for departure from Hobart, Tasmania, Australia, prompted changes in training procedures intended to improve emergency communications, the Australian Transport Safety Bureau (ATSB) said.

The final ATSB report on the incident said that a starter on the right engine had failed, resulting in smoke and sparks, and prompting the captain to order an evacuation of 26 passengers on May 17, 2005. Eleven people were injured during the evacuation, which was completed in 64 seconds.

The report said that “problems with communication involving the pilots,

ground crew and cabin crew ... created potential risk and [have] led to improved safety action for the future.”

As a result of the incident, the operator ordered several changes, including “improved aircraft maintenance procedures relating to markings on door slide brackets, defined phraseology to be used in emergency communications between aircraft dispatchers and pilots, door closure procedures for engine starts, improved policy on cockpit discussion restrictions after door closure and improved cabin crew procedures and training.”

ATSB said that copies of the investigation report would be distributed to all high-capacity regular public transport operators in Australia and

that a briefing about the safety issues identified during the investigation would be delivered to an operator that was acquiring the fleet of 717s.



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Warnings Issued on Fuel Filter Monitors

Some older models of aircraft fuel filter monitors may be ineffective, warned the Energy Institute, a London-based organization representing individuals and businesses in the energy industry.

The institute said that fuel filter monitors “qualified to IP 1583 fourth edition or earlier editions cannot be regarded as fail-safe devices for preventing water [from] being delivered to aircraft” during fueling operations.

In addition, water-absorbent polymers from the fuel filter monitors may migrate downstream into aircraft fuel systems — a process that can clog fuel filters and can result in other related problems.

The institute said that fuel filter monitors should always be used according to manufacturer instructions and should never be used in fuel containing any fuel system icing inhibitor — known as diethylene glycol monomethylether (DiEGME) or Prist — or in areas in which free water in the fuel may contain high concentrations of salt.

Safeguards Urged to Limit Post-Impact Fires

Post-impact fires are a major cause of fatalities and injuries in otherwise-survivable accidents involving aircraft weighing 5,700 kg/12,500 lb or less, and actions should be taken to reduce related risks, the Transportation Safety Board of Canada (TSB) said in a 2006 report.

The report said that post-impact fires present significant risks to occupants of small aircraft because of the volatility of aviation fuel and its proximity to the occupants, limited escape time, limited energy-absorption characteristics of the airframes, the propensity for immobilizing injuries and the inability of rescue workers to

suppress post-impact fires in time to prevent related injuries and deaths.

“Considering the propensity for rapid propagation and the catastrophic consequences of fuel-fed [post-impact fire], the most effective defense ... is to prevent the fire from occurring at impact, either by containing fuel or preventing ignition or both,” the report said.

The report said that fuel system technologies have been developed in land vehicles and helicopters to lessen the chances of post-impact fires and that a requirement for similar engineering changes in small aircraft could “significantly increase the rate of occupant survival.”



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Runway Overrun Prompts Safety Recommendations

The U.S. National Transportation Safety Board (NTSB) has issued four safety recommendations as a result of its investigation of an accident in which a Bombardier Challenger CL-600-1A11 overran a runway and continued across a six-lane highway in Teterboro, New Jersey, U.S.

The airplane was destroyed in the Feb. 2, 2005, accident, and two pilots and two people on the ground were seriously injured. NTSB said that the probable

cause was the pilots' "failure to ensure the airplane was loaded within weight-and-balance limits, and their attempt to take off with the center of gravity ... well forward of the forward takeoff limit, which prevented the airplane from rotating at the intended rotation speed."

The safety recommendations call on the U.S. Federal Aviation Administration to:

- Disseminate guidance to U.S. Federal Aviation Regulations Part

135 (commuter and on-demand) operators and principal inspectors to describe appropriate methods by which a certificate holder can show that it has "adequate operational control over all on-demand charter flights conducted under the authority of its certificate";

- Review agreements between Part 135 certificate holders and others to identify agreements that allow "a loss of operational control by the certificate holder" and to require revision of these agreements;
- Require that Part 135 certificate holders "ensure that seatbelts at all seat positions are visible and accessible to passengers before each flight"; and,
- Require any Part 135 cabin personnel who "could be perceived by passengers as equivalent to a qualified flight attendant" to undergo basic, FAA-approved training in preflight briefing and safety checks, emergency exit operations and emergency equipment use.



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In Other News ...

The **Civil Air Navigation Services Organisation (CANSO)** is being added to the list of organizations invited as observers to meetings of the Council of the International Civil Aviation Organization (ICAO). ICAO President Roberto Kobeh González said that CANSO's contributions would be vital in the implementation of a comprehensive worldwide air traffic management system. ... The **Civil Aviation Safety Authority** of Australia (CASA) has proposed a new set of regulations

covering aircraft maintenance. The proposed regulations are intended to "achieve a better focus on safety outcomes," CASA said. ... The **Directorate General for Civil Aviation** and the **Airports Authority of India** have signed an agreement with the **U.S. Federal Aviation Administration** for help in modernizing India's civil aviation infrastructure. Among the first issues being considered are air traffic

control training and procedures, and aviation safety standards and regulations.



Compiled and edited by Linda Werfelman.