



# National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

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Date: July 7, 1989

In reply refer to: A-89-51 and -52

Mr. Robert E. Whittington  
Acting Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

On May 5, 1988, a Cessna model 208 Caravan I turbopropeller airplane, N88TJ, experienced severe shimmying of the nose wheel assembly during landing at the Orlando International Airport, Orlando, Florida. Subsequently, maintenance personnel determined that the nose landing gear shimmy dampener had failed and that cracks were present in the lower portion of the engine mount ring near the left and right points of attachment to the nose landing gear. Operators of other Cessna Caravan I airplanes have since advised the Safety Board of several similar occurrences of cracked engine mount rings resulting from shimmy of the nose landing gear. The Safety Board believes that if these cracks had gone undetected and had been allowed to develop through the mount ring, they might have induced occurrence of the "whirl mode"<sup>1</sup> phenomenon or might have otherwise resulted in separation of the engine from the aircraft.

The original shimmy dampeners installed on Caravan I airplanes have had an extensive history of failure. Service records of Cessna Aircraft Company reflect 250 failures of these components and 17 reports of cracking in the lower portion of the engine mounts near the attachment points of the nose landing gear. As a result, Cessna issued Service Bulletin (SB) No. CAB88-14, "Shimmy Dampener Improvement," on April 8, 1988. The Service Bulletin provided a new and improved shimmy dampener, part No. 2643090-1, for the Caravan I model 208, 208A, and 208B airplanes. In the bulletin, Cessna recommends that the improved shimmy dampener be installed within the next 200 hours or during annual inspection, or during an equivalent inspection program for airplanes utilizing the Cessna progressive care inspection program.

The Safety Board believes that installation of the improved shimmy dampeners on all Caravan I airplanes is essential to prevent shimmy of the nose landing gear and to minimize the potential for structural damage to the engine mount ring. However, neither SB No. CAB88-14 nor the Caravan I maintenance manual addresses the potential problem of cracked engine mount rings as a result of shimmy dampener failure. Because of the substantial number of failures of the older, obsolete shimmy dampeners, and the

<sup>1/</sup> A type of flutter instability involving gyroscopic, wobbling motion of the propeller-nacelle-powerplant system surrounding a flexible engine mount.

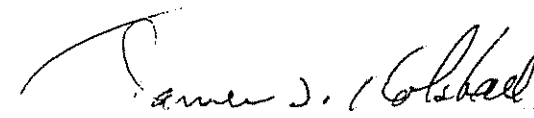
possibility of undetected cracks existing in associated engine mount rings, the Safety Board also believes that the lower portion of the engine mount rings near the points of attachment to the nose landing gear should be inspected for cracks at the next scheduled inspection. Thereafter, the lower portion of the engine mount ring should be routinely inspected for cracks whenever shimmy of the nose landing gear occurs.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an airworthiness directive applicable to Cessna Caravan I, model 208, 208A, and 208B airplanes requiring the following at the next 100-hour or annual inspection, whichever occurs first: (1) An inspection for cracks of the lower portion of the engine mount ring adjacent to the attachment points of the nose landing gear. Any mount ring found cracked should be repaired or replaced. (2) Installation of the improved nose landing gear shimmy dampener, Cessna part No. 2643090-1, in accordance with Cessna Service Bulletin No. CAB88-14. (Class II, Priority Action) (A-89-51)

Require the Cessna Aircraft Company to issue a supplement to the maintenance manuals for all Caravan I model 208, 208A, and 208B airplanes requiring an inspection for cracks in the lower portion of the engine mount rings near the points of attachment to the nose landing gear whenever shimmy of the nose landing gear occurs. (Class II, Priority Action) (A-89-52)

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.

  
By: James L. Kolstad  
Acting Chairman