EXECUTIVE SUMMARY

AIRCRAFT ACCIDENT INVESTIGATION

TH-1H, T/N 73-21840
FORT RUCKER, ALABAMA
30 JUNE 2009

During a night training sortie on 30 June 2009, a TH-1H aircraft, tail number (T/N) 73-21840, experienced a hard landing due to loss of tail rotor thrust at 2140 local time (L) in Conecuh National Forrest near remote training site 406 (RT-406), 43 miles west of Cairns Army Airfield (KOZR). Following the hard landing, the mishap pilot (MP) and two student pilots egressed the aircraft and were subsequently picked up by a local U.S. Army Search and Rescue helicopter. The three pilots were transported to Southeast Alabama Medical Center for medical evaluation where they were treated for minor injuries associated with the force of the impact. The mishap aircraft (MA) was based at Fort Rucker, Alabama and assigned to the 23rd Flying Training Squadron, of the 58th Special Operations Wing, to provide undergraduate helicopter pilot training for the United States Air Force. The mishap occurred within the lateral boundaries of Alert Area 211 (A-211) in South Central Alabama. A-211 is specially designated airspace which may contain a high volume of rotary and fixed wing training. The MA sustained $6.7M in damage. There was no damage to private property.

The MA departed KOZR at 2052L to conduct night vision goggle (NVG) remote procedures training. Approximately 48 minutes after takeoff, while conducting high reconnaissance of RT-406, at 300' above ground level (AGL) and approximately 65 knots with a 15 knot right quartering tailwind, the aircraft experienced a loss of tail rotor thrust, yawed right, and entered an uncontrollable right rotation about its vertical axis. The MP managed to make it to an open field upon which he entered a near vertical autorotation and the aircraft landed hard, impacting the ground in a level attitude at over 1,500 fpm (24 to 38 Gs). Investigation revealed that the number one tail rotor drive shaft hanger bearing assembly failed. The aft splines of the shaft and coupling had deteriorated to the point that they no longer meshed, causing complete loss of tail rotor thrust. The failure of the number one hanger bearing assembly spline shaft and aft coupling is the root cause of the mishap. Sufficient evidence exists to conclude that a misalignment somewhere within the tail rotor drive system and flawed assembly of the bearing to the shaft contributed to the spline shaft and coupling failure.

The MP was rested, current, and qualified. Given the flight parameters where the tail rotor lost thrust, he performed admirably to land the aircraft without fatality. All maintenance personnel who worked on the MA were well trained, experienced, and qualified. A thorough review of maintenance documentation and procedures revealed no adverse trends which could have contributed to the accident. The misalignment and flawed assembly were not readily identifiable due to lack of vibration analysis and inadequate maintenance technical data.

Under 10 U.S.C. 2254(d), any opinion of the accident investigators as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report may not be considered as evidence in any civil or criminal proceeding arising from the accident, nor may such information be considered an admission of liability of the United States or by any person referred to in those conclusions or statements.