Aviation Investigation Final Report

Location:	Anchorage, Alaska	**Accident Number:**	ANC14LA041
Date & Time:	June 11, 2014, 11:40 Local	**Registration:**	N356EV
Aircraft:	AIRBUS/EUROCOPTER AS 350 B3	**Aircraft Damage:**	Substantial
Defining Event:	Ground resonance	**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot had been hired to ferry the recently-purchased turbine-powered helicopter to the new owner's facility and to provide the second pilot, the new owner, with transition flight training while en route. Unable to start the helicopter, despite believing he was following the correct procedures, the first pilot enlisted help from another pilot and eventually started the helicopters engine. While the helicopter was operating at flight-idle, the yellow "TWT.GRIP" light illuminated on the annunciator panel, and the first pilot instructed the second pilot to slowly advance the collective-mounted throttle twist grip to the open position until the light went out. As the second pilot advanced the throttle, the engine speed immediately increased to a high rpm and the helicopter began to shake violently. It subsequently rotated about 240° to the left, sustaining substantial damage to the tail boom and main rotor drive system.

Examination of the engine and full authority digital engine control (FADEC) systems revealed no preaccident mechanical failures or malfunctions with the helicopter that would have precluded normal operation. The accident pilot reported that he had extensive experience in helicopters that had two-channel FADEC systems, but did not recall how much time he had in helicopters with single-channel FADEC systems. The accident helicopter was equipped with a single-channel FADEC system, which required a different starting procedure than an engine with a two-channel FADEC.

Given the absence of mechanical anomalies and the pilot's unfamiliarity with the single-channel FADEC system, it is likely that he used the incorrect start and run-up procedure, which resulted in an inadvertent overspeed of the helicopter's engine and main rotor drive system.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot’s improper engine start procedure, which resulted in an overspeed of the engine and main rotor drive system.

Findings

Personnel issues	Use of policy/procedure - Pilot
Personnel issues	Use of equip/system - Pilot

Factual Information

History of Flight

Standing-engine(s) start-up	Ground resonance (Defining event)

On June 11, 2014, about 1140 Alaska daylight time, an Airbus (formerly Eurocopter) AS350 B3 helicopter, N356EV, was substantially damaged when it was involved in an accident near Anchorage, Alaska. The helicopter was operated as a Title 14*Code of Federal Regulations* Part 91 personal flight.

The first pilot, a certificated flight instructor, reported that he had been hired to ferry the recently-purchased helicopter to Georgetown, Texas. He added that he was providing AS350 B3 helicopter transition training to the second pilot, who was the new owner of the helicopter. The first pilot reported that, after two unsuccessful attempts to start the helicopter, he asked for assistance from a mechanic. The mechanic then contacted the operator's rotor wing training manager to assist the first pilot in starting the helicopter. He said that while talking with the operator's rotor wing training manager on a cell phone about the correct starting procedure, the second pilot exited the helicopter, and a mechanic boarded the helicopter and sat down in the right seat. Once the helicopter was successfully started, the mechanic disembarked, and the second pilot again boarded the helicopter, and sat down in the right seat.

The first pilot noted that while the helicopter was operating at flight-idle, the yellow "TWT.GRIP" light was illuminated on the annunciator panel, and he instructed the second pilot to slowly advance the collective-mounted throttle twist grip to the open position until the light went out. He stated that, as the second pilot began to advance the throttle to the open position, the engine speed immediately increased to a very high rpm and the helicopter began to shake violently, and it subsequently rotated about 240° to the left. The pilot performed an emergency engine shutdown, and both pilots exited the helicopter.

The helicopter's fuselage and main rotor drive system sustained substantial damage.

The helicopter was equipped with a Turbomeca Arriel 2B-series turbine engine, with a single channel, full authority digital engine control (FADEC) fuel control system.

The first pilot reported that he had extensive experience in various Airbus/Eurocopter helicopter models, which included about 6,000 flight hours in AS350 B2 helicopters, and about 2,000 flight hours in AS350 B3 helicopters (primarily equipped with the Turbomeca Arriel 2B1-series engine, which have a dual-channel FADEC). However, he could not recall how much experience he had in AS350 B3 helicopters equipped with the Turbomeca Arriel 2B-series engine. He thought he followed the engine start procedures in the helicopter's flight manual.

The operator's rotor wing training manager, who assisted the pilot in starting the helicopter, reported, in part: "I sensed when talking with the pilot that he did not have much experience, at least quality experience, with the AS 350 helicopter, especially the AS 350 B3…"

Airbus/Eurocopter Information Notice number 2169-I-67, dated June 6, 2010, specifically alerts operators to the different starting procedures for the AS350 B3 helicopters equipped with 2B- and 2B1-series engines.

A detailed wreckage and engine systems examination revealed no preaccident mechanical failures or malfunctions with the helicopter that would have precluded normal operation. The accident helicopter's hydro-mechanical metering unit (HMU), digital engine control unit (DECU), and the vehicle and engine multifunction display (VEMD) were removed and shipped to Turbomeca USA's analytical facility in Grand Prairie, Texas.

The HMU was placed on a test stand, and it operated in accordance with the manufacture's specifications. The VEMD and DECU were downloaded, which revealed no discernable fault codes of failures associated with the accident start sequence. The VEMD recorded a significant main rotor overspeed limit during the accident.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	57
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Helicopter	**Second Pilot Present:**	Yes
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	December 12, 2013
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 8000 hours (Total, all aircraft), 3000 hours (Total, this make and model)		

Student pilot Information

Certificate:	Airline transport	**Age:**	61,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	February 1, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	AIRBUS/EUROCOPTER	**Registration:**	N356EV
Model/Series:	AS 350 B3	**Aircraft Category:**	Helicopter
Year of Manufacture:	2002	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	3649
Landing Gear Type:	Unknown; High skid	**Seats:**	6
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo shaft
Airframe Total Time:		**Engine Manufacturer:**	Turbomeca
ELT:	Installed	**Engine Model/Series:**	Arriel 2B
Registered Owner:	Can See Aviation LLC	**Rated Power:**	
Operator:	Can See Aviation LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PAMR,137 ft msl	**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 7500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.14 inches Hg	**Temperature/Dew Point:**	12°C / 1°C
Precipitation and Obscuration:			
Departure Point:	Anchorage, AK (MRI)	**Type of Flight Plan Filed:**	None
Destination:	Gulkana, AK (GKN)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Airport Information

Airport:	Merril Field MRI	**Runway Surface Type:**	Concrete
Airport Elevation:	137 ft msl	**Runway Surface Condition:**	Dry
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	61.213333,-149.84445

Administrative Information

Investigator In Charge (IIC):	Johnson, Clinton
Additional Participating Persons:	Robert J Beck; Federal Aviation Administration ; Anchorage , AK Marcus Roulet; Federal Aviation Administration; Anchorage , AK
Original Publish Date:	May 5, 2021
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=89436