



Aviation Investigation Final Report

Location:	Des Moines, Iowa	Incident Number:	CEN12IA554
Date & Time:	August 15, 2012, 08:35 Local	Registration:	N108EK
Aircraft:	Cessna 560XL	Aircraft Damage:	Minor
Defining Event:	Flight control sys malf/fail	Injuries:	8 None
Flight Conducted Under:	Part 91: General aviation - Executive/Corporate		

Analysis

The flight crewmembers reported that, after about 10 minutes of cruise flight at 40,000 ft pressure altitude, they observed an autopilot pitch trim mistrim annunciation and an associated master caution indication. As they began to reference the applicable checklist, the autopilot automatically disengaged, the airplane suddenly pitched down, and the airspeed increased to about 30 knots over the redline. The flight crew regained control of the airplane and then leveled it at 33,000 ft pressure altitude. The flight crew subsequently landed the airplane without further incident. The autopilot was not used after the temporary loss of airplane control; however, the electric pitch trim was used after passing through 10,000 ft mean sea level, and it functioned normally. A postincident examination of the autopilot, pitch trim systems, and horizontal stabilizer did not reveal any anomalies consistent with a loss of control.

Probable Cause and Findings

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

A temporary loss of control during cruise flight for reasons that could not be determined because postincident examination of the autopilot, pitch trim systems, and horizontal stabilizer revealed no anomalies consistent with a loss of control.

Findings

Aircraft	Elevator tab control system - Malfunction
Aircraft	Autopilot system - Malfunction
Aircraft	(general) - Not attained/maintained

Factual Information

History of Flight

Enroute-cruise	Flight control sys malf/fail (Defining event)
Enroute-cruise	Loss of control in flight
Uncontrolled descent	Attempted remediation/recovery
Emergency descent	Off-field or emergency landing

On August 15, 2012, about 0835 central daylight time, a Cessna 560XL, N108EK, diverted to Des Moines International Airport (DSM), Des Moines, Iowa, following a loss of control during cruise at Flight Level (FL) 400. The two pilots and six passengers were not injured. The airplane sustained minor damage. The aircraft was registered to New Heights Aviation LLC and operated by Elliott Aviation under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the flight, which was operated on an instrument flight rules flight plan. The flight originated from Flying Cloud Airport (FCM), Eden Prairie, Minnesota, at 0748, with an intended destination of Arlington Municipal Airport (GKY), Arlington, Texas.

The flight crew reported that after about 10 minutes of cruise flight at 40,000 feet pressure altitude, they observed an autopilot pitch trim mis-trim (AP Pitch Mis-trim) annunciation and associated master caution. As they began to reference the applicable checklist, the autopilot automatically disengaged and the airplane suddenly pitched down to about 20 degrees. The airspeed increased to about 30 knots over redline. The flight crew recovered and leveled the airplane at 33,000 feet pressure altitude. They subsequently elected to divert to DSM and landed without further incident. The autopilot was not used for the duration of the flight. However, the electric pitch trim was used passing 10,000 feet mean sea level and it functioned normally. The flight crew noted that an "abnormally high amount of water" was observed to be draining from the tailcone during the postflight inspection.

The cockpit voice recorder (CVR) was downloaded and a summary of the recording was prepared. The CVR summary revealed that as the airplane was leveling at flight level (FL) 400, the co-pilot noted "it's not keeping up with it." He commented about referencing the checklist and added "R-five." About 30 seconds later, a high-pitched tone was recorded simultaneously with the sound of a "thunk" and rustling sounds. Two additional high pitched tones were recorded. These were followed by a beeping tone consistent with the overspeed warning, which lasted for 40 seconds. The flight crew discussed deploying the speed brake and declared an emergency. The flight crew regained control of the airplane and diverted to DSM. During the descent, the crew discussed that they would not use the autopilot for the duration of the flight. Based on further discussions recorded by the CVR, the pilots executed a full flap approach. They subsequently landed at 0844 without further incident.

The required pilot actions related to an AP Pitch Mis-trim annunciation were contained on page R-5 of the Pilots' Abbreviated Checklist – Emergency/Abnormal Procedures. The procedure called for: (1) AP Trim Disc Button – Press and Release (if elevator trim not in motion); Pitch Trim – Adjust (as required); and Autopilot – Engage (as desired).

A postincident examination of the autopilot, pitch trim systems and two-position horizontal stabilizer system did not reveal any anomalies. The left and right elevator electric trim actuators and the autopilot elevator drive servo were subsequently replaced. The airplane was returned to service without any further difficulties.

Pilot Information

Certificate:	Airline transport; Flight instructor	Age:	42
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	No
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	May 21, 2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	July 22, 2012
Flight Time:	7709 hours (Total, all aircraft), 620 hours (Total, this make and model), 5328 hours (Pilot In Command, all aircraft), 114 hours (Last 90 days, all aircraft), 58 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Airline transport; Flight instructor	Age:	58
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	5-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	No
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	April 24, 2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	July 22, 2014
Flight Time:	8605 hours (Total, all aircraft), 2010 hours (Total, this make and model), 7025 hours (Pilot In Command, all aircraft), 87 hours (Last 90 days, all aircraft), 52 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N108EK
Model/Series:	560XL	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	560-5032
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	June 29, 2012 AAIP	Certified Max Gross Wt.:	20000 lbs
Time Since Last Inspection:	595 Hrs	Engines:	2 Turbo fan
Airframe Total Time:	4510 Hrs at time of accident	Engine Manufacturer:	P&W CANADA
ELT:	Installed, not activated	Engine Model/Series:	PW545A
Registered Owner:	New Heights Aviation LLC	Rated Power:	3372 Lbs thrust
Operator:	Elliott Aviation Flight Services Inc	Operating Certificate(s) Held:	On-demand air taxi (135)
Operator Does Business As:	Elliott Aviation	Operator Designator Code:	JEMA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	DSM,958 ft msl	Distance from Accident Site:	20 Nautical Miles
Observation Time:	09:54 Local	Direction from Accident Site:	360°
Lowest Cloud Condition:	Few / 180 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	200°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.92 inches Hg	Temperature/Dew Point:	23°C / 15°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Minneapolis, MN (FCM)	Type of Flight Plan Filed:	IFR
Destination:	Arlington, TX (GKY)	Type of Clearance:	IFR
Departure Time:	07:48 Local	Type of Airspace:	

Airport Information

Airport:	Des Moines International DSM	Runway Surface Type:	
Airport Elevation:	958 ft msl	Runway Surface Condition:	
Runway Used:		IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	Full stop

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Minor
Passenger Injuries:	6 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	8 None	Latitude, Longitude:	41.533889,-93.663055(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	James Konig; FAA – Des Moines Flight Standards; Ankeny, IA Theresa Jacobsen; Elliott Aviation; Des Moines, IA Andrew Hall; Cessna Aircraft Company; Wichita, KS
Original Publish Date:	February 23, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=84721

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