



Aviation Investigation Final Report

Location:	Winsted, Minnesota	Accident Number:	CHI05LA148
Date & Time:	June 17, 2005, 13:00 Local	Registration:	N122AR
Aircraft:	Reay Titan Tornado II	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The amateur-built airplane was destroyed when it impacted the terrain in a marshy area while maneuvering. A witness reported that he observed the airplane doing an aerobatic loop. He reported that when the airplane got to the bottom arc of the loop, the engine "sputtered or coughed a couple of times," and then it regained power and sounded normal. He reported, "The airplane leveled off a short distance and then went into a straight nosedive. The engine sounded like it was full throttle." A second witness reported that he heard the engine "really laboring ... and could tell [the pilot] was climbing like a son of a gun and going for altitude. But when I looked up he was headed straight down" He reported, "He was pulling back hard and recovered to level flight - or nearly level - but just for a moment." He reported, "When he pulled out he must have been pulling some really high g's to pull out at that speed." The inspection of the flight control system did not reveal any evidence of pre-impact failure or malfunction. The inspection of the engine revealed no deficiencies that would have precluded normal engine operation. Aerobatic flight maneuvers were prohibited in the airplane's Experimental Amateur-built Aircraft Operating Limitations issued by the Federal Aviation Administration.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot performed an unauthorized aerobatic loop and failed to maintain control of the airplane.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: MANEUVERING

Findings

1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (C) AEROBATICS - PERFORMED - PILOT IN COMMAND
3. PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

4. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On June 17, 2005, at 1300 central daylight time, an amateur-built Reay Titan Tornado II, N122AR, was destroyed when it impacted a marshy area of Grass Lake, near Winsted, Minnesota. The pilot was fatally injured. The Title 14 Code of Federal Regulations Part 91 personal flight departed Winsted Municipal Airport (10D) at an unknown time. Visual meteorological conditions prevailed at the time of the accident. No flight plan was filed.

A witness reported that he observed the following:

"I walked out of my garage onto my front lawn and saw the airplane doing a loop. When I saw it, he was at the top of the loop. When he got to the bottom arc of the loop the engine sputtered or coughed a couple of times. Then it regained power and sounded fine. He leveled off a short distance and then went into a straight nosedive. The engine sounded like it was full throttle. I saw it till [it] got below the tree line."

Another witness reported that he was at the Winsted airport at the time of the accident. He reported that he heard the engine "really laboring ... and could tell [the pilot] was climbing like a son of a gun and going for altitude. But when I looked up he was headed straight down" He reported, "He was pulling back hard and recovered to level flight - or nearly level - but just for a moment. That was all I saw before he went behind the tree line." The witness reported that the engine was at full throttle. He reported, "When he pulled out he must have been pulling some really high g's to pull out at that speed." The witness explained that the Tornado "picks up speed really fast when you go straight down."

PERSONNEL INFORMATION

The pilot held a private pilot certificate with a single-engine land rating. He held a third class medical certificate dated November 17, 2004. The pilot reported his total flight time was 6,000 hours during his last medical examination. He was issued a Repairman Experimental Aircraft Builder rating on May 10, 2001.

AIRCRAFT INFORMATION

The airplane was a single-engine Reay Titan Tornado II, serial number D9791250HK0274. The airplane was an ultra-light type aircraft, utilizing a high wing and pusher engine and propeller mounted at the trailing edge of the wing. A single boom connected the cabin area to the empennage. The airplane seated two and had a maximum gross weight of 1,000 pounds. The flight controls were conventional, and the wings had electric flaps. The engine was a 100

horsepower Rotax 912S engine. The Special Airworthiness Certificate was issued on May 10, 2001. The last condition inspection was conducted on January 27, 2005. The airplane had a total of 1,704.4 hours at the time of the inspection.

The "Experimental Amateur-Built Aircraft Operating Limitations" issued by the Federal Aviation Administration for this aircraft stated the following limitation:

"This aircraft is prohibited from aerobatic flight; i.e., an intentional maneuver involving an abrupt change in the aircraft's attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight."

METEOROLOGICAL INFORMATION

At 1255, the surface weather observation reported at Glencoe Municipal Airport (GYL), Glencoe, Minnesota, located about 12 nautical miles south of the accident site was: Winds 100 at 4 knots, 10 statute miles visibility, sky clear, temperature 25 degrees Celsius (C), dew point 6 degrees C, altimeter 29.97 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage impacted the terrain in a marshy area in Grass Lake. The door was found about 200 feet from the main wreckage, but all other wreckage was located with the main wreckage. The wing separated from the cabin structure. The engine and propeller separated from the fuselage. The boom and empennage separated from the fuselage, but was mainly intact. The landing gear remained attached to the cabin.

A Federal Aviation Administration airworthiness inspector examined the wreckage. The inspector reported that the inspection of the flight control system did not reveal any evidence of pre-impact failure or malfunction.

The inspection of the engine revealed that the crankshaft could be rotated and "thumb" compression was obtained. The rocker assemblies all worked and strong air pressure was observed. The fuel pump could be heard with each rotation of the gearbox. Suction and pressure could be felt at the respective inlet and outlet ports. Rotation of the magneto was observed, but it was not tested due to impact damage. The carburetors received impact damage, but fuel bowl integrity and float operation were observed.

The three-bladed propeller remained attached to the propeller flange. All three blades remained attached to the propeller hub. The propeller blades exhibited chordwise scratching.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot at the Mercy Hospital Morgue, Coon Rapids, Minnesota, on June 18, 2005.

A Forensic Toxicology Fatal Accident Report was prepared by the FAA Civil Aeromedical Institute. The report was negative for all substances tested.

TESTS AND RESEARCH

The inboard main wing spar sections from both wings were sent to the National Transportation Safety Board's Materials Laboratory for inspection. The inspection revealed that both wing spars failed from overstress to the rear. There was evidence of rearward bending in the top and bottom spar cap from both wings. There was no evidence of a preexisting crack in the spars. There was no evidence of upward bending in the top and bottom spar caps.

ADDITIONAL INFORMATION

Parties to the investigation included the Federal Aviation Administration and Rotax engines.

The aircraft wreckage was released to pilot's family.

Pilot Information

Certificate:	Private	Age:	63, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 3 With waivers/limitations	Last FAA Medical Exam:	March 1, 2001
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	6000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Reay	Registration:	N122AR
Model/Series:	Titan Tornado II	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	D9791280HK0274
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	January 1, 2005 Condition	Certified Max Gross Wt.:	1000 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	1704 Hrs as of last inspection	Engine Manufacturer:	Rotax
ELT:	Installed, not activated	Engine Model/Series:	912S
Registered Owner:	Edgar A. Reay	Rated Power:	100 Horsepower
Operator:		Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	GYL,992 ft msl	Distance from Accident Site:	12 Nautical Miles
Observation Time:	12:55 Local	Direction from Accident Site:	170°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	100°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.96 inches Hg	Temperature/Dew Point:	25°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Winsted, MN (10D)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:		Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	44.949722,-94.066665

Administrative Information

Investigator In Charge (IIC):	Silliman, James
Additional Participating Persons:	Brian McCullagh; FAA-Minneapolis FSDO; Minneapolis, MN David Ek; Rotax Engines; Arlington, TX
Original Publish Date:	April 25, 2006
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=61761

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).