National Transportation Safety Board
Aviation Accident Factual Report

Location:	Mead, CO	**Accident Number:**	DEN02LA103
Date & Time:	09/08/2002, 0930 MDT	**Registration:**	N551SA
Aircraft:	Adler SA-1	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

On September 8, 2002, approximately 0930 mountain daylight time, an Adler SA-1 gyroplane, N551SA, registered to and operated by the pilot, was destroyed when it impacted terrain and burned near Mead, Colorado. The private pilot was fatally injured. Day visual meteorological conditions prevailed, and no flight plan had been filed for the personal flight being conducted under Title 14 CFR Part 91. The local flight originated approximately 0900 from the Jefferson County (Jeffco) Airport, Broomfield, Colorado.

Two witnesses told a sheriff's deputy that the gyroplane sounded as if it was "struggling." Two other witnesses submitted written statements. One witness said that he "could tell the aircraft was having mechanical problems." The gyroplane dropped about 1,000 feet, "lost a wing" and began to "spin and tumble out of control." Another witness said he heard the engine either "miss or stall slightly," and also saw "a rotor or a wing" come off in flight. All four witnesses saw smoke as the gyroplane impacted terrain and immediately caught fire.

According to the deputy's report, a rotor blade was found about 150 feet north of the point of impact, and other debris was strewn to the southwest. The impact site was circular in shape, approximately 5 to 6 meters (16 to 20 feet) in diameter. The accident occurred 0.25-mile south of (Weld) county road 32 and 0.25-mile west of county road 13, at a location of 40 degrees, 12'48.30" north latitude, and 104 degrees, 57'02.80" west longitude.

The co-builder of the accident gyroplane --- a physician and a close friend of the pilot --- contacted three gyroplane experts: the designer of the SA-1 Dominator and President of Rotor Flight Dynamics; a gyroplane aerodynamist; and the designer of another gyroplane. They examined the wreckage and compiled both a factual and analytical report. The following is based on the factual portion of the report.

The separated rotor blade was bowed upward and had fractured about 2 feet from the tip. The fracture was consistent with positive overload. There was orange paint and primer transfer marks on the top and upper leading edge (the tail and nose cones were painted orange). The attached rotor blade was also bent upward. The propeller blades exhibited no strike marks. The rotor head and hub bar were intact. The hub bar, normally bent 2.5 degrees upward, was found

bent approximately 10 degrees upward. The roll pillow blocks bore evidence of hammering and were mushroomed. The pitch stops were similarly damaged.

The analytical portion of the report noted the necessity of maintaining blade loading at all times in order to maintain main rotor blade rotation. The fractured main rotor blade was "a purely upward bending moment which could only have occurred if the blade rpm had dramatically slowed...If totally unloaded, the blade rpm can deteriorate as fast as 120 rpm/sec." Normal rotor blade rpm is 320 to 400 rpm. If rotor blade rpm were allowed to drop and the velocity of air moving through the rotor system were to increase, severe blade "flapping" would result. The rotor head had been subjected to severe blade flapping as evidenced by the pounding and mushrooming of the roll pillow blocks and the bent hub bar. The authors said there is no in-flight maneuver that can lead to blade flapping at normal rotor rpms. Only the unloading of the rotor blades will do this.

FAA's Civil Aeromedical Institute (CAMI) conducted a toxicological screen on specimens taken from the pilot and found 2.024 (ug/mL, ug/g) paroxetine in the blood. According to a CAMI toxicologist, paroxetine is an antidepressant and contraindicated. Some of the adverse effects include drowsiness, muscle weakness, agitation, and tremors." When advised of these results, the physician/co-builder of N551SA contacted the pilot's personal physician and learned that he had prescribed the drug for the treatment of fibromyalgia, a condition manifested by muscle soreness.

Pilot Information

Certificate:	Private	**Age:**	51, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	Gyroplane	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	04/13/2001
Occupational Pilot:		**Last Flight Review or Equivalent:**	02/16/2002
Flight Time:	280 hours (Total, all aircraft), 44 hours (Total, this make and model), 222 hours (Pilot In Command, all aircraft), 44 hours (Last 90 days, all aircraft), 18 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Adler	**Registration:**	N551SA
Model/Series:	SA-1	**Aircraft Category:**	Gyroplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental	**Serial Number:**	001
Landing Gear Type:	Tricycle	**Seats:**	1
Date/Type of Last Inspection:	06/18/2002, Condition	**Certified Max Gross Wt.:**	900 lbs
Time Since Last Inspection:	44 Hours	**Engines:**	1 Reciprocating
Airframe Total Time:	44 Hours at time of accident	**Engine Manufacturer:**	Rotax
ELT:	Not installed	**Engine Model/Series:**	912WLS
Registered Owner:	Steven H. Adler	**Rated Power:**	100 hp
Operator:	Steven H. Adler	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	DEN, 5431 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	0953 MDT	**Direction from Accident Site:**	135°
Lowest Cloud Condition:	Few / 9000 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	24°C / 8°C
Precipitation and Obscuration:			
Departure Point:	Broomfield, CO (BJC)	**Type of Flight Plan Filed:**	None
Destination:	(BJC)	**Type of Clearance:**	None
Departure Time:	0900 MDT	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.214167, -104.950278

Administrative Information

Investigator In Charge (IIC):	Arnold W Scott
Additional Participating Persons:	Mark A Schofield; FAA Flight Standards District Office; Denver, CO
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.