



Aviation Investigation Final Report

Location:	Starbuck, Minnesota	Accident Number:	CEN23LA227
Date & Time:	June 2, 2023, 14:50 Local	Registration:	N1025T
Aircraft:	Kolb Twinstar	Aircraft Damage:	Substantial
Defining Event:	Abnormal runway contact	Injuries:	1 Serious, 1 Minor
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor and the pilot, who was also the builder of the airplane, were practicing soft field landings with the tailwheel-equipped experimental airplane. They performed two three-point landings to the dry turf without incident. During touchdown on the third landing, with the pilot on the flight controls, the left wheel departed from the left strut. The airplane began sliding on the turf and nosed over, coming to rest inverted. The airplane sustained substantial damage to the fuselage, both wings, and the empennage.

A postaccident metallurgical examination of the left main landing gear revealed that it failed when the left axle fractured from bending overstress consistent with upward forces on the wheel and outward portion of the axle.

It is likely that the pilot executed an improper landing flare, which resulted in a hard landing that fractured the left axle in bending overstress, and a subsequent loss of control and nose over.

Probable Cause and Findings

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

The pilot's improper landing flare and hard landing, which resulted in the left axle fracturing from bending overstress.

Findings

Personnel issues	Aircraft control - Pilot
Personnel issues	Incorrect action performance - Pilot
Aircraft	Landing flare - Not attained/maintained
Aircraft	Main gear strut/axle/truck - Failure
Aircraft	Main gear strut/axle/truck - Capability exceeded

Factual Information

History of Flight

Landing-flare/touchdown	Abnormal runway contact (Defining event)
Landing-flare/touchdown	Part(s) separation from AC
Landing-flare/touchdown	Loss of control on ground
Landing-flare/touchdown	Nose over/nose down
Post-impact	Evacuation

On June 2, 2023, about 1450 central daylight time, a Kolb Twinstar Mark III airplane, N1025T, sustained substantial damage when it was involved in an accident near Starbuck, Minnesota. The flight instructor and the private pilot sustained serious injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 instructional flight.

The purpose of the flight was for the private pilot, who was also the airplane owner and builder, to work on soft field landings in the tailwheel-equipped experimental airplane. Before the flight, the pilot “topped off” the airplane with fuel and performed a preflight inspection with no anomalies noted. The flight instructor and the pilot also checked meteorological data before the training and observed nothing of concern.

The airplane departed from the Chandler Field Airport (AXN), Alexandria, Minnesota, about 1409, for the Starbuck Municipal Airport (D32), Starbuck, Minnesota. The airplane entered the traffic pattern at D32 and the instructor and pilot performed two three-point landings to the dry turf on runway 15. During the touchdown on the third landing, with the pilot on the flight controls, the left wheel departed from the left strut. The airplane began sliding on the turf and nosed over, coming to rest inverted. The two occupants were able to egress from the airplane without further incident.

The airplane sustained substantial damage to the fuselage, both wings, and the empennage. The airplane was equipped with an airframe parachute system manufactured by ASR-Pioneer that did not activate during the accident sequence.

The pilot reported that the turf runway was in “great shape.” He added that the runway was examined after the accident for holes or ruts and nothing of concern was found.

A postaccident metallurgical examination of the left main landing gear revealed that it failed when the left axle fractured from bending overstress consistent with upward forces on the wheel and outward portion of the axle. The chemical composition of the fractured axle was consistent with Type 4130 alloy steel. The hardness of the axle was consistent with typical

tensile strengths for this alloy. There were no metallurgical deficiencies noted with the left main landing gear.

The Federal Aviation Administration's Airplane Flying Handbook (FAA-H-8083-3C) discusses a soft field landing with a tailwheel-equipped airplane and states:

The tailwheel should touchdown simultaneously with or just before the main wheels and should then be held down by maintaining firm back-elevator pressure throughout the landing roll. This minimizes any tendency for the airplane to nose over and provides aerodynamic braking. The use of brakes on a soft field is not needed because the soft or rough surface itself provides sufficient reduction in the airplane's forward speed. Often, it is found that upon landing on a very soft field, the pilot needs to increase power to keep the airplane moving and from becoming stuck in the soft surface.

Flight instructor Information

Certificate:	Commercial; Flight instructor	Age:	35, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	Toxicology Performed:	
Medical Certification:	Class 1 Without waivers/limitations	Last FAA Medical Exam:	August 3, 2022
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	February 5, 2022
Flight Time:	(Estimated) 1581 hours (Total, all aircraft), 3 hours (Total, this make and model), 1534 hours (Pilot In Command, all aircraft), 245 hours (Last 90 days, all aircraft), 90 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Private	Age:	57,Male
Airplane Rating(s):	Single-engine land; Single-engine sea	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	None	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 3 Without waivers/limitations	Last FAA Medical Exam:	March 31, 2023
Occupational Pilot:	No	Last Flight Review or Equivalent:	July 16, 2022
Flight Time:	(Estimated) 250 hours (Total, all aircraft), 8.9 hours (Total, this make and model), 250 hours (Pilot In Command, all aircraft), 12 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Kolb	Registration:	N1025T
Model/Series:	Twinstar III	Aircraft Category:	Airplane
Year of Manufacture:	2021	Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	M3X20-4-00116
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	May 15, 2023 Annual	Certified Max Gross Wt.:	1320 lbs
Time Since Last Inspection:	2 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	40 Hrs at time of accident	Engine Manufacturer:	Rotax Aircraft Engines
ELT:	Not installed	Engine Model/Series:	912 ULS
Registered Owner:	On file	Rated Power:	100 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None
Operator Does Business As:	On file	Operator Designator Code:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KGHW,1393 ft msl	Distance from Accident Site:	9 Nautical Miles
Observation Time:	14:55 Local	Direction from Accident Site:	73°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	8 knots / 15 knots	Turbulence Type Forecast/Actual:	None / None
Wind Direction:	190°	Turbulence Severity Forecast/Actual:	N/A / N/A
Altimeter Setting:	30.02 inches Hg	Temperature/Dew Point:	30°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Alexandria, MN (AXN)	Type of Flight Plan Filed:	None
Destination:	Starbuck, MN	Type of Clearance:	None
Departure Time:	14:09 Local	Type of Airspace:	Class G

Airport Information

Airport:	STARBUCK MUNI D32	Runway Surface Type:	Grass/turf
Airport Elevation:	1140 ft msl	Runway Surface Condition:	Dry
Runway Used:	15/33	IFR Approach:	None
Runway Length/Width:	2512 ft / 198 ft	VFR Approach/Landing:	Full stop;Straight-in;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	1 Serious, 1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Serious, 1 Minor	Latitude, Longitude:	45.598893,-95.536149(est)

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Daniel Sindt; FAA Minneapolis FSDO; Minneapolis, MN Bernhard Kobylak (Accredited Representative); Federal Safety Investigation Authority; Vienna, OF Jordan Paskevich (Technical Advisor); Rotax Aircraft Engines; Vernon, OF
Original Publish Date:	July 10, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=192316

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