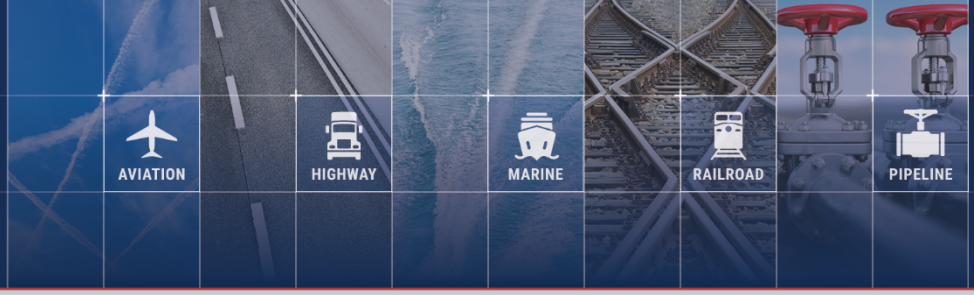

Aviation Investigation Final Report

Location:	Palmer, Alaska	**Accident Number:**	ANC21LA038
Date & Time:	May 9, 2021, 14:40 Local	**Registration:**	N8627J
Aircraft:	Enstrom F-28F	**Aircraft Damage:**	Substantial
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	3 None
Flight Conducted Under:	Part 91: General aviation - Other work use		

Analysis

During a helicopter tour flight, the clutch disengage light dimly illuminated, flickered, then fully illuminated. As the pilot began to descend for landing, he felt the belt clutch disengage, and the engine rpm separated from the transmission rpm indicating the helicopter had lost engine power to the rotor system. The pilot entered an autorotation and made a forced landing in a nearby open field. The helicopter touched down with a tailwind of about 13 mph, slid forward and nosed down. A main rotor blade impacted the ground in front of the helicopter followed by a main rotor blade impacting the tail section just forward of the stabilizers, which resulted in substantial damage to the fuselage.

A postaccident examination of the helicopter revealed that the main belt drive tensioning system (belt clutch) inadvertently disengaged in flight. Testing found that the disengagement occurred due to inadequate clearance between the clutch handle and the roll pin in the handle bellcrank when the handle was in the stowed position.

As a result of this accident, the helicopter manufacturer issued a service bulletin that clarified the rigging requirements for the clutch handle and allowed for a minor modification to the handle to increase clearance between the handle and the roll pin in the bellcrank.

Probable Cause and Findings

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

A loss of drive to the rotor system due to the disengagement of the main belt drive tensioning system, which resulted in a forced landing. The disengagement was due to inadequate clearance between the clutch handle and the roll pin in the handle bellcrank when the handle was in the stowed position.

Findings

Aircraft	Engine/transmission coupling - Unintentional use/operation

Factual Information

History of Flight

Enroute	Powerplant sys/comp malf/fail (Defining event)

On May 9, 2021, about 1440 Alaska daylight time, an Enstrom F-28F, N8627J, sustained substantial damage when it was involved in an accident near Palmer, Alaska. The pilot and two passengers were not injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 sightseeing tour flight.

The operator, Talahiem Air Service, was providing helicopter tour flights for the Great Alaska Aviation Gathering that was taking place at the fairgrounds in Palmer, Alaska. The pilot reported that he started flying the helicopter about 1330 and had made 10 flights before the accident flight. Before the first flight, he fueled the helicopter with 25 gallons of fuel, performed a normal start-up, and then engaged the belt clutch. The pilot added that the belt engagement felt normal; the clutch snapped into over-center; and the clutch light that indicates clutch disengagement went out. The tour flights were conducted around the local area, lasted for about 7 minutes, and terminated back at the fairgrounds. During the accident flight, while returning to the fairgrounds, the clutch disengage light dimly illuminated, flickered, and then fully illuminated. The pilot reported that there was “no vibration and nothing to indicate that there was any problem,” but he prepared for a sudden belt clutch release. As the pilot started to descend for the approach into the fairgrounds, he felt the belt clutch disengage, and the engine rpm separated from the transmission rpm indicating the helicopter had lost engine power to the rotor system.

The pilot estimated that the helicopter was about 200 ft above ground level at an airspeed of about 80 mph when he reduced the throttle, lowered the collective, and entered an autorotation. The approach and flare were normal as he lined up for a forced landing in an open field with a tailwind of about 13 mph. The helicopter touched down with about 15 mph of ground speed on plowed dry dirt and slid. Subsequently, the helicopter nosed down, and a main rotor blade impacted the ground in front of the helicopter followed by a main rotor blade impacting the tail section just forward of the stabilizers. The tail boom was partially separated from the fuselage, and the fuselage sustained substantial damage. The pilot and two passengers were able to exit the helicopter with no further incident.

The clutch lever is located in the cabin. The engine is started with the belt disengaged. After the engine is started, the belt is engaged by pulling the clutch engaging lever up and aft. When fully engaged, the belt tensioning mechanism locks over-center. The clutch engaging lever is then stowed on the floor. When the clutch is engaged, the lever will lie flat on the floor. This prevents the clutch from being disengaged accidentally. When the mechanism locks over-center, it opens a switch that deactivates a warning light on the instrument panel. This switch is activated by the actual locking mechanism, not a control, so it is a direct indication that the mechanism is locked.

Postaccident examination of the helicopter clutch handle operation revealed that in the stowed position it was not firmly on the floor, and it was possible to move the handle enough to unlock the belt engagement mechanism.

Further examination of the belt engagement mechanism and the clutch handle was conducted by Enstrom Helicopter Corporation personnel under the supervision of Federal Aviation Administration inspectors. Enstrom reported, in part:

There is no evidence of any situation where the clutch mechanism will disengage unless the cable is moved to push the 28-13274 bellcrank out of the over-center locked position. There was no evidence of anything except the 28-16515 bellcrank at the clutch handle that could move the clutch cable. Wear marks on the clutch handle, statements from the pilot, and information found during the follow-on investigation in August 2021 are all consistent with the handle making contact with the roll pin in the bellcrank while the handle was disengaged from the bellcrank. If the handle is in contact with the roll pin when the handle is disengaged from the bellcrank, movement of the handle can move the bellcrank and thus move the clutch control cable.

The manufacturer issued a service bulletin (SB) on the clutch handle rigging in December 2021. The SB states in part:

Enstrom received a report of a main belt drive tensioning system ("clutch") inadvertently disengaging in flight. Investigation concluded the disengagement occurred because the handle was able to contact the roll pin in the handle bellcrank when the handle was in the disengaged and stowed position.

This Service Directive Bulletin clarifies the rigging requirements for the clutch handle and provides procedures for ensuring the rigging can be obtained.

Pilot Information

Certificate:	Commercial; Flight instructor; Private	**Age:**	69,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Helicopter	**Toxicology Performed:**	
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 11, 2021
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 5, 2020
Flight Time:	(Estimated) 8450 hours (Total, all aircraft), 5500 hours (Total, this make and model), 8400 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Enstrom	**Registration:**	N8627J
Model/Series:	F-28F	**Aircraft Category:**	Helicopter
Year of Manufacture:	1989	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	760
Landing Gear Type:	Skid	**Seats:**	3
Date/Type of Last Inspection:	September 1, 2020 Annual	**Certified Max Gross Wt.:**	2600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	4650.7 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C91A installed, not activated	**Engine Model/Series:**	HIO-360-F1AD
Registered Owner:	TALAHEIM AIR SERVICE LLC	**Rated Power:**	225 Horsepower
Operator:	TALAHEIM AIR SERVICE LLC	**Operating Certificate(s) Held:**	Rotorcraft external load (133)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PAAQ,230 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	14:53 Local	**Direction from Accident Site:**	28°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Overcast / 9000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots / 18 knots	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.1 inches Hg	**Temperature/Dew Point:**	14°C / 1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Palmer, AK	**Type of Flight Plan Filed:**	None
Destination:	Palmer, AK	**Type of Clearance:**	None
Departure Time:	14:45 Local	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	2 None	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	3 None	**Latitude, Longitude:**	61.564116,-149.12691(est)

Administrative Information

Investigator In Charge (IIC):	Swenson, Eric
Additional Participating Persons:	Ben Herning; FAA; Anchorage, AK William E. Taylor Jr.; Enstrom Helicopter Corporation; Menominee, MI Jesse Vos; Enstrom Helicopter Corporation; Menominee, MI
Original Publish Date:	December 6, 2022
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=103058

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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.