



# Aviation Investigation Final Report

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<b>Location:</b>	San Francisco, California	<b>Accident Number:</b>	DCA24LA110
<b>Date &amp; Time:</b>	February 25, 2024, 21:02 Local	<b>Registration:</b>	N13138
<b>Aircraft:</b>	Boeing 757-224	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Abnormal runway contact	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Part 91: General aviation - Flight test		

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## Analysis

United Airlines (UA) flight 3872 experienced a tailstrike while taking off from San Francisco International Airport (SFO), San Francisco, California. The flight was a local maintenance test flight. The purpose of the test flight was to validate maintenance conducted after a write-up for abnormal flight deck noises that occurred on a previous flight.

According to the flight crew, they conducted a flaps 5, reduced power takeoff from runway 28R. The captain recalled the aircraft accelerated faster than normal and had the propensity to lift off prior to the rotation speed of 127 knots. At rotation speed, the captain began a normal aft pull on the control yoke and the pitch attitude increased faster than expected. The captain just called "positive rate" when the crew heard and felt a "boom." As this flight was a test flight, it was not loaded with passengers and cargo to a takeoff weight typical of flights the pilot flying normally flew. The pilot flying rotated at a rate "normal" to his experience, however because the accident aircraft was loaded lighter than normal, the normal rotation inputs resulted in an over-rotation.

The crew assessed the instruments and controllability and decided to continue their climb to flight level (FL) 190 [19,000 feet] where they conducted the tailstrike checklist. They returned to SFO and conducted a flaps 30 landing with no further incident. Prior to leaving the flight deck after the flight, the first officer received the pitch report for takeoff which showed that tail contact occurred about 12.2 degrees during departure and the actual pitch for this departure reached 15.3 degrees.

Inspection of the aircraft showed that the tail strike damaged the chord, web, and stiffeners of the auxiliary power unit firewall bulkhead. Because the damage would adversely affect the structural strength of the bulkhead and require major repair or replacement, the damage was

considered substantial. The investigation determined that the maintenance conducted prior to this test flight was not related to the accident.

## Probable Cause and Findings

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

The crew's over-rotation of the aircraft pitch during takeoff which resulted in a tailstrike.

### Findings

Personnel issues	
	Incorrect action performance - Pilot

## Factual Information

### History of Flight

<b>Takeoff</b>	Abnormal runway contact (Defining event)
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### Pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	48,
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	5-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 With waivers/limitations	<b>Last FAA Medical Exam:</b>	November 27, 2023
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	October 10, 2023
<b>Flight Time:</b>	15575 hours (Total, all aircraft), 1250 hours (Total, this make and model), 3100 hours (Pilot In Command, all aircraft), 230 hours (Last 90 days, all aircraft), 58 hours (Last 30 days, all aircraft)		

### Co-pilot Information

<b>Certificate:</b>	Airline transport	<b>Age:</b>	31
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	5-point
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 None	<b>Last FAA Medical Exam:</b>	February 20, 2024
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	February 17, 2024
<b>Flight Time:</b>	2471 hours (Total, all aircraft), 260 hours (Total, this make and model), 434 hours (Pilot In Command, all aircraft), 135 hours (Last 90 days, all aircraft), 45 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Boeing	<b>Registration:</b>	N13138
<b>Model/Series:</b>	757-224	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1999	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Commuter; Normal; Transport	<b>Serial Number:</b>	0138
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	182
<b>Date/Type of Last Inspection:</b>	June 9, 2023 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	255000 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>	85724 Hrs as of last inspection	<b>Engine Manufacturer:</b>	ROLLS-ROYC
<b>ELT:</b>	C126 installed, not activated	<b>Engine Model/Series:</b>	RB-211-535E4B-37
<b>Registered Owner:</b>	UNITED AIRLINES INC	<b>Rated Power:</b>	42700 Lbs thrust
<b>Operator:</b>	UNITED AIRLINES INC	<b>Operating Certificate(s) Held:</b>	Flag carrier (121)

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Night
<b>Observation Facility, Elevation:</b>		<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>		<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 800 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>		<b>Temperature/Dew Point:</b>	
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	San Francisco, CA	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	San Francisco, CA	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>		<b>Type of Airspace:</b>	Air traffic control;Class B

## Airport Information

<b>Airport:</b>	SAN FRANCISCO INTL SFO	<b>Runway Surface Type:</b>	Concrete
<b>Airport Elevation:</b>	13 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	10L/28R	<b>IFR Approach:</b>	ILS
<b>Runway Length/Width:</b>	11870 ft / 200 ft	<b>VFR Approach/Landing:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	37.6193,-122.3816

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Silva, Sathya
<b>Additional Participating Persons:</b>	Carson King; United Airlines FAA; FAA
<b>Original Publish Date:</b>	July 17, 2024
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 4</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=193849">https://data.ntsb.gov/Docket?ProjectID=193849</a>

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](#).