National Transportation Safety Board
Aviation Incident Final Report

Location:	Honolulu, Hawaii	**Incident Number:**	DCA18IA092
Date & Time:	February 13, 2018, 13:02 Local	**Registration:**	N773UA
Aircraft:	Boeing 777 222	**Aircraft Damage:**	Minor
Defining Event:	Powerplant sys/comp malf/fail	**Injuries:**	378 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

The airplane, a Boeing 777-222, experienced a full length fan blade fracture in the No. 2 (right) engine, a Pratt & Whitney (P&W) PW4077 turbofan, while in cruise flight shortly before top of descent. The examination of the No. 2 engine revealed most of the inlet duct and all of the left and right fan cowls were missing. Two small punctures were found in the right side fuselage just below the window belt with material transfer consistent with impact from pieces of an engine fan blade.

The examination of the engine's fan blades revealed fan blade No. 11 was fractured transversely across the airfoil directly above the fairings that are between the base of each blade. The other fan blade, which was identified as fan blade No. 10 and was the adjacent trailing blade, was fractured across the airfoil at about midspan. Laboratory examination of fan blade No. 11 revealed a low cycle fatigue (LCF) fracture that originated on the interior cavity wall directly below the surface.

The entire fan blade set, including fan blade No. 11 had last been overhauled by P&W's Overhaul & Repair (O&R) facility in July 2015. As part of the overhaul process, the blades underwent a fluorescent penetrant inspection (FPI) and a thermal acoustic imaging (TAI) inspection. The records for the TAI inspection in July 2015 as well as an earlier TAI accomplished in March 2010 revealed a thermal indication in the same location as where the LCF crack occurred. The records for the fractured fan blade's July 2015 TAI inspection was annotated 'paint' that, according to the inspector, was consistent with him accepting the indication because he thought it was an issue with the paint.

P&W developed the TAI inspection process in about 2005 to be able to inspect the interior surfaces of the hollow core PW4000 fan blade. P&W in keeping with NDI industry practice when implementing a new inspection process classified the TAI as a new and emerging technology and therefore did not have to develop a formal program for initial and recurrent training, certify the TAI inspectors, or have a Level 3 inspector on staff, as is done in other established NDI techniques. But in 2015, and still in 2018 when the incident occurred, P&W was still categorizing the TAI as a new and emerging technology after having inspected over 9,000 fan blades. At one point, P&W did provide training on the TAI, however, neither of the two inspectors were permitted to attend the training so that they could work to clear out a backlog of blades in the shop.

The TAI inspector who worked on the incident fan blade stated that they never got any feedback from the engineers about the blades that they had rejected. When they would reject a blade, it would go to an engineer for further evaluation. However, they never got any feedback from the engineers if the rejection was a valid rejection or if it was a false positive.

After it was determined that the two previous TAIs of the fractured fan blade showed thermal indications at the location of the fatigue crack, P&W initiated an over-inspection of all of the digital images of the TAIs accomplished on PW4000 112-inch fan blades.

Because the aluminum versus the CFRP structure has the ability to yield while absorbing the same amount of energy, it can redistribute the FBO loads between the fan case and the inlet without causing failure to the inlet, or the fan case to inlet interface. The inlet and fan cowl structural analyses showed that the CFRP aft bulkhead design was less capable than the aluminum bulkhead that was tested during engine certification test and determined that multiple possible scenarios could have led to their separation; 1) the inlet aft bulkhead load path damage caused by the unanticipated magnitude of the displacements induced by the displacement wave following the FBO combined with the anticipated inner barrel fragment induced damage progressed under rundown loads, resulting in portions of the inlet departing within one second following the FBO, 2) the departure of portions of the inlet including the lower aft bulkhead caused the static and/or dynamic loads to increase beyond the fan cowls capability, that lead to the departure of large portions of the fan cowl, 3) the fan cowl honeycomb core strength was reduced below its capability to react rundown loads due to moisture ingression at the hinge points leading to large portions of the fan cowl departing prior to the inlets departure.

Probable Cause and Findings

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

the fracture of a fan blade due to P&W's continued classification of the TAI inspection process as a new and emerging technology that permitted them to continue accomplishing the inspection without having to develop a formal, defined initial and recurrent training program or an inspector certification program. The lack of training resulted in the inspector making an incorrect evaluation of an indication that resulted in a blade with a crack being returned to service where it eventually fractured.

Contributing to the fracture of the fan blade was the lack of feedback from the process engineers on the fan blades the inspectors sent to the process engineers for evaluation of indications that they had found.

Findings

Organizational issues	Oversight of maintenance - Maintenance provider
Organizational issues	Initial training - Maintenance provider

Factual Information

History of Flight

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

On February 13, 2018, about 1200 Hawaiian standard time (HST), United Airlines flight 1175, a Boeing 777-222, N773UA, experienced an in-flight separation of a fan blade as well as portions of the inlet and fan cowl of the No. 2 (right) engine, a Pratt & Whitney (P&W) PW4077, over the Pacific Ocean enroute to the Daniel K. Inoyue International Airport (HNL), Honolulu, Hawaii. While the airplane was in level cruise flight at flight level (FL) 360, the flight crew heard a loud bang that was followed by a violent shaking of the airplane followed by warnings of a compressor stall. The flight crew shut down the engine, declared an emergency, and proceeded to HNL without further incident. There were no injuries to the 374 passengers and crew onboard and the airplane received minor damage. The flight was operating under the provisions of 14 *Code of Federal Regulations* Part 121 as a regularly scheduled passenger flight from the San Francisco International Airport, San Francisco, California (SFO) to HNL.

At the time of the event, there were three pilots on the flight deck: the captain, who was the pilot monitoring, the first officer (FO), who was the pilot flying, and a jump seat rider, who was an off-duty United Airlines 777 FO.

The flight departed SFO on time and the push back, taxi, takeoff, and climb were normal. The flight was about 120 miles from HNL at flight level (FL) 360 when there was a violent jolt and very loud bang that both pilots stated was followed by extreme airframe vibrations. The pilots reported that immediately after the jolt and loud bang, the autopilot disconnected, and the airplane began to roll to the right. A positive exchange of controls was accomplished with the captain becoming pilot flying. The pilots stated that about 15 to 30 seconds after the jolt and loud bang, the engine instruments indicated a failure of the number 2 engine. After accomplishing the Severe Engine Damage checklist, the crew shut down and secured the engine. The jump seat rider stated that after the right engine was shutdown, the vibration subsided although the controllability of the airplane was not normal. The crew declared an emergency and began a drift down descent to FL 230. The captain directed the jump seat rider to go back into the cabin to assess the condition of the engine. The jump seat rider noted that the engine was oscillating and that the cowling was missing. He took a video of the engine to show the captain and the FO what they were dealing with. The pilots reported that concurrently, the purser had come to the flight deck and the captain briefed her about the emergency and that they would be landing at HNL. The airplane continued to HNL and made a visual approach and landed on Runway 8R without further incident.

Pilot Information

Certificate:	Airline transport	**Age:**	57
Airplane Rating(s):	Single-engine land; Single-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 27, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 10, 2017
Flight Time:	13592 hours (Total, all aircraft), 360 hours (Total, this make and model), 6 hours (Last 24 hours, all aircraft)		

Co-pilot Information

Certificate:	Airline transport	**Age:**	60
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	October 5, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 3, 2017
Flight Time:	11318 hours (Total, all aircraft), 10087 hours (Total, this make and model), 6 hours (Last 24 hours, all aircraft)		

The captain, age 57, reported a total of 13,592 hours total time, with 360 hours in the B777. He held an FAA Airline Transport Pilot certificate with type ratings in the B777, B747, B737, B757, B767, and SD-3. He held a valid first class medical certificate with a restriction for glasses for near vision. His most recent flight review was October 10, 2017.

The first officer, age 60, reported a total of 11,318 hours total time, with 10,087 in the B777. He held an FAA Airline Transport Pilot certificate with type ratings in the B777 and B747. He held a valid first class medical certificate with a restriction for glasses for near vision. His most recent flight review was October 3, 2017.

Aircraft and Owner/Operator Information

Aircraft Make:	Boeing	**Registration:**	N773UA
Model/Series:	777 222 222	**Aircraft Category:**	Airplane
Year of Manufacture:	1995	**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	26929
Landing Gear Type:	Retractable - Tricycle	**Seats:**	381
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	545000 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:		**Engine Manufacturer:**	Pratt & Whitney
ELT:	Installed, not activated	**Engine Model/Series:**	4077
Registered Owner:		**Rated Power:**	
Operator:		**Operating Certificate(s) Held:**	Flag carrier (121)

The Boeing 777-200 is a long-range, wide-body, twin-engine airplane, with a maximum takeoff weight of 545,000 pounds. The incident airplane was equipped with P&W PW4077 turbofans. The airplane had accumulated 89,723 hours and 16,339 cycles since new.

The PW4077 is a dual-spool, axial-flow, high bypass turbofan engine that features a 1-stage 112-inch diameter fan, 6-stage low pressure compressor (LPC), 11-stage high pressure compressor (HPC), annular combustor, 2-stage high pressure turbine (HPT) that drives the HPC, and a 7-stage low pressure turbine (LPT) that drives the fan and LPC.

According to United Airlines' maintenance records, the No. 2 engine had accumulated 77,593 hours time since new (TSN) and 13,921 cycles since new (CSN) and 8,579 hours and 1,464 cycles since the last overhaul. The engine was installed on the airplane on October 18, 2015, at an airplane time and cycles since new of 81,144 hours and 14,875 cycles, respectively. The engine had operated 8,579 hours and 1,464 cycles since it had been installed.

The PW4000 112-inch engine fan blade is a hollow core, wide chord airfoil made of a titanium alloy with 6 percent vanadium and 4 percent aluminum as alloying elements. The fan blade is about 40.5-inches long from the base of the blade root to the tip of the airfoil and about 12.5- and 22.25-inches wide at the blade root and blade tip, respectively. A fan blade weighs a maximum of 34.85 pounds.

The inlet is a cantilevered structure that directs the airflow into the fan case in a controlled and uniform manner. The inlet consists of two concentric cylinders (the inner and outer barrels) joined by forward and aft bulkheads and a lip skin. The inlet aft bulkhead was constructed of CFRP on the production airplanes. During engine fan blade out (FBO) certification testing the inlet cowl construction consisted of an aluminum bulkhead. The inlet is bolted to the forward end of the fan case though an attach ring using 44 bolted connections. Loads and displacements resulting from a fan blade out event (FBO) are transferred between the inlet and the engine fan case though the attachment bolts and the attachment ring.

The fan cowls are two cylindrical halves located aft of the inlet that enclose the engine fan case and the external engine accessories which provides a smooth aerodynamic surface over the core of the engine fan case. The fan cowls are supported on the forward end by the inlet and on the aft end by the thrust reverser. Additionally, the fan cowls are attached to the fan cowl support beam using four hinges (total of eight) at the top and latched (four latches) at the bottom to allow for the fan cowls to be opened for maintenance.

The engine is certified under FAR part 33 regulations. To comply with the regulations, the engine successfully demonstrated containment and safe shutdown of an engine after intentional fracture of a fan blade at redline speed. Although it is necessary to install an inlet for proper engine operation during these tests, it is not required that this inlet meet production standards. The test inlet used was of a different design which included an aluminum aft bulkhead instead of the production CFRP aft bulkhead. Additionally, these tests are conducted without the fan cowls attached. The inlet and fan cowls are certified under FAR Part 25 of which Boeing was responsible for.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:		**Visibility**	
Lowest Ceiling:		**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	
Precipitation and Obscuration:			
Departure Point:	San Francisco, CA (KSFO)	**Type of Flight Plan Filed:**	IFR
Destination:	Honolulu, HI (KHNL)	**Type of Clearance:**	IFR
Departure Time:	12:00 Local	**Type of Airspace:**	

Airport Information

Airport:	Honolulu KHNL	**Runway Surface Type:**	
Airport Elevation:	12 ft msl	**Runway Surface Condition:**	
Runway Used:	8R	**IFR Approach:**	ILS
Runway Length/Width:	12000 ft / 200 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	15 None	**Aircraft Damage:**	Minor
Passenger Injuries:	363 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	378 None	**Latitude, Longitude:**	21.317777,-157.920272

Additional Information

Because of the United Airlines fan blade separation incident and the finding that the fractured fan blade had a rejectable indication at the previous TAI, P&W initiated an overinspection and reviewed the TAI inspection records for all 9,606 previously inspected PW4000 112-inch fan blades.

On March 22, 2019, the FAA issued Airworthiness Directive 2019-03-01: Airworthiness Directives; Pratt&Whitney Division, Turbofan Engines to require an initial and recurring TAI inspection of PW4000 hollow core fan blades.

Damage to Aircraft

The fan blade in position No. 11 was fractured transversely across the airfoil about 1.44-inches above the fairing at the leading edge and slightly below the surface of the fairing at the trailing edge. There was a piece of fan blade found up against the leading edges of the fan exit guide vanes at about 4 o'clock. This piece of fan blade was about 15-inches wide chord wise, 23-inches long radially, and had a fracture surface on the inner end that corresponded to the fracture surface on blade No. 11.

Metallurgical examination revealed a fatigue fracture that had initiated from a subsurface origin in a region of micro texturing consisting mostly of primary alpha crystals on the interior surface of the hollow core fan blade. The examination also revealed that the fan blade's material conformed to the specified titanium alloy's requirements.

There was extensive damage to the interior surface of the fan case in the form of gouging and cracking. Although there were cracks in the case and the outer layer of the Kevlar wrap was split, there was no penetration of debris. The Kevlar® environmental wrap was in place around the fan case. The Kevlar environmental wrap had an approximately 35-inch long axial tear at about 3 o'clock that was between about 5.5- and 40.4-inches aft of A-flange. The outermost layer of the Kevlar under the environmental wrap was visible through the tear and there was an area that was approximately 3-inch axial by 2-inch circumferential about 15-inches aft of A-flange that had a frayed appearance and there were tears and separations. The Kevlar environmental wrap had a wrinkled appearance between about 1 and 5 o'clock with outward bulging of the belt between about 2 and 4 o'clock. The maximum deformation of the Kevlar environmental wrap was about 2.5-inches at about 3 o'clock. The location of the maximum deformation of the wrap was coincident with the approximately 34-inch long crack on the inside of the fan case.

Interior surfaces of the fan case and the remains of the inlet duct showed scratches and gouges that were in a spiral pattern across the fan case and front flange onto the inlet duct to the broken edge of the duct on the inboard area of the nacelle. The examination of the fan case showed that there were three distinct patterns of tracks along the flow path that appeared to spiral forward from the plane of the fan blades' leading edge across the A-flange on to the inlet duct's inner barrel.

The majority of the inlet assembly was missing. All the inlet lip skin, the forward bulkhead, most of the inner and outer barrels, and about half of the rear bulkhead were not recovered. The majority of both inner and outer halves on the fan cowl were also missing. The missing parts were lost at sea.

The left and right side thrust reversers, and the exhaust cowl were in place and intact.

There were two small dents and punctures in the right side of the fuselage, below the window belt in the vicinity of seat rows 20 and 21. Laboratory examination of the skin surrounding the puncture found embedded particles of largely titanium and vanadium, which along with aluminum are the alloying elements of the fan blade material.

The right main landing gear door, portions of the right wing, and the right horizontal stabilizer exhibited small dents and scratches.

Flight recorders

The airplane was equipped with a Honeywell HFR5-V cockpit voice recorder (CVR) and a Honeywell 4700 flight data recorder (FDR). Both recorders were in good condition and the data were extracted normally and examined at the NTSB's Vehicle Recorder Division laboratory in Washington, D.C.

Tests and Research

Fan Blade Inspection

United Airlines utilized P&W, the engine manufacturer, to accomplish inspection and overhaul of the fan blades per maintenance manual requirements. The installed set of fan blades, including the fractured fan blade, had undergone two overhauls at which time the blades underwent a thermal acoustic imaging (TAI) inspection. At the initial TAI accomplished on the fractured fan blade in 2010, there was a small indication at the location of the origin of the crack. Review of the records from the 2015 TAI show that there was a larger indication in the same area. At the time of each TAI, the inspectors attributed the indication to a defect in the paint that was used during the TAI process and allowed the blade to continue the overhaul process and be returned to service.

Inspection Process

The TAI inspection process is used to detect internal and external cracking in hollow core fan blades. Sound energy is utilized to generate an excitation of the fan blade's internal and external structure. The sound energy excitation will cause relative movement between each side of a contacting discontinuity that will cause frictional heating. The frictional heat generated by the movement of each side of the discontinuity is detected on the surface of the fan blade by a thermal sensor. After both sides of the fan blade have been completely scanned, the images are processed by a computer that are then displayed on a monitor for the inspector to evaluate. The computer has the capability to enhance the image to assist the inspector in evaluating any indications. Certain types of indications may require the inspector to reinspect the area, which may require repainting of the fan blade and repeating the TAI process. If a fan blade has an indication that the inspector is not able to clearly evaluate, the inspector is to forward the images along with the fan blade to a Process Engineer for further evaluation and possibly further non-destructive testing such as ultrasonic and/or x-ray inspection.

P&W initiated the TAI inspection process around 2005. From the outset of the inspection to the time the United Airlines fractured fan blade was inspected and up to the time of the incident at HNL, P&W did not have a defined training and certification regimen for the TAI inspectors. The 1st shift inspector was trained by the engineers who developed the process and the 2nd shift inspector, who was the one who last inspected the United Airlines fan blade that fractured, was trained by the 1st shift inspector. Both inspectors stated that their training on the TAI was about 40 hours of on-the-job training. In comparison, the certification requirements for the commonly used eddy current and ultrasonic inspections are 40 hours of classroom training and 1,200 and 1,600 hours of practical experience, respectively. In 2005, when the TAI was initiated, P&W, following standard NDT industry practice, categorized the TAI as a new and emerging technology that permitted the inspection to be accomplished without establishing a formal training program and certification requirements. In 2015, when the fractured fan blade was last inspected, and in 2018, when the fan blade fractured, P&W still categorized the TAI as a new and emerging technology, although over 9,000 fan blades had been manufactured and inspected. P&W did offer training on the TAI, however, the 1st and 2nd shift inspectors were not permitted to attend so that they could work on clearing the backlog of fan blades that were in the shop. After the incident, P&W reported that they had developed a curriculum for TAI initial and recurrent training.

Inspection Facility

The TAI is accomplished in an enclosed air-conditioned room within P&W's overhaul and repair facility in East Hartford, Connecticut. The room has large windows that allow the afternoon summer sun to shine into the room. The TAI thermal scanners can detect the incremental temperature increase that occurs if there is a defect in the blade and the afternoon sun would cause ghost images on the thermal scans. Although the inside of the TAI room is air conditioned, the shop area is not air conditioned so the workers in the area would often go into the room to cool off in the summer. The TAI scanners would capture the thermal image of the worker. The TAI room air conditioner could not keep the room to within the required temperature limits for TAI in the summertime and they had to place an additional portable A/C unit in the room. After the incident, P&W put screens up and tinted the windows as well as installing flashing lights to alert the shop workers that a TAI is ongoing to preclude the false thermal images. In addition, P&W upgraded the room's air conditioner that can maintain the temperature to the TAI's requirements.

The 2nd shift TAI inspector, who inspected the fractured blade, had been a P&W employee for about 34 1/2 years, and was a lead non-destructive test (NDT) inspector. He held an FAA repairman's certificate. He stated that he would never get any feedback from the engineers about those blades that he rejected. He would never find out if the blade was actually cracked or if it was a false positive. If it was cracked, the blade would be scrapped. And if it was a false positive, the blade would reenter the overhaul process after the TAI inspection.

Analysis of Nacelle Structural Failure

Multiple failure scenarios of the inlet and fan cowl nacelle structures were investigated using both finite element and progressive failure analyses utilizing the physical evidence and data collected from this incident and validated by data gathered from original engine certification and a previous incident in 2010 (that incident was not investigated by NTSB).

Inlet Fan Blade Fragment Damage

Boeing expanded its use of their progressive damage simulation analysis beyond the typical 20-30 milliseconds following a fan blade out and bird strike impact analyses to capture the progressive failure effects for up to 2 seconds (2000 milliseconds) following the FBO event. The analysis indicated the separation of the inlet and fan cowl occurred within less than 2 seconds following the fan blade separation.

During the event three fan blade fragments traveled forward of the attachment flange and penetrated both the inner and outer face sheets of the inner barrel, and two of those fragments exited the outer barrel. The amount of inner barrel damage to the inlet consistent with observed aircraft damage alone would cause the inlet to separate.

Inlet Damage due to Displacement Wave

In support of the investigation, P&W and Boeing applied current state of the art FBO simulation analyses. P&W provided Boeing with a simulation of the incident containment displacement wave and Boeing used this information in a simulation analysis of the inlet.

The simulation studies identified a critical threshold for the displacement of the bulkhead caused by the displacement wave and failure of the CFRP bulkhead. The certification test simulation studies with the aluminum aft bulkhead predicted a bulkhead displacement of 0.47 inches with localized yielding, but without a failure of the inlet structure or the inlet to fan case interface.

The incident analysis determined a displacement of 0.55 inches and delamination of the installed CFRP bulkhead face sheets, which exceeded the face sheet laminate rupture strain in compression leading to the failure of the inlet to fan case interface. The aluminum structure has the ability to yield and absorb the same amount of energy and redistribute the FBO loads between the fan case and the inlet without causing failure to the inlet and the fan case to inlet attachment.

The post-event simulation studies indicated that a combination of the aft bulkhead damage and the inner barrel damage consistent with the observed aircraft incident damage would cause portions of the inlet to separate.

Fan Cowl Moisture Ingression Damage

Boeing records indicated that evidence of moisture ingression had been found on multiple other 777 fan cowls, and although varied in extent and location, was on some occasions reported in the area of the latches on the lower fan cowl panel and the area of the hinge attachments. Such moisture ingression would degrade the allowable strength of the cowls. Although the event fan cowls were not recovered to verify the presence of moisture ingression, it is possible that this type of degradation existed and contributed to the fan cowl separation.

Fan Cowl Instability

The analysis indicated that large fan cowl deflections may have been induced following the departure of portions of the inlet. The forward portion of the fan cowl would no longer be capable of remaining engaged after portions of the inlet and the lower aft bulkhead departed the airplane. As a result, the fan cowl to no longer maintain its shape when subjected to the engine imbalance loads and buffeting from air loads. The large panel deflections could have induced internal stresses that were in excess of those observed during certification and exceeded the capability of the fan cowl panels and latches.

Administrative Information

Investigator In Charge (IIC):	English, William	**Report Date:**	
Additional Participating Persons:			
Publish Date:			
Note:	The NTSB traveled to the scene of this incident.		
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96738		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.