



National Transportation Safety Board Aviation Accident Final Report

Location:	Oklahoma City, Oklahoma	Accident Number:	CEN13TA113
Date & Time:	December 21, 2012, 10:00 Local	Registration:	N753CC
Aircraft:	Cessna 550	Aircraft Damage:	Substantial
Defining Event:	Aircraft wake turb encounter	Injuries:	1 Minor, 1 None
Flight Conducted Under:	Public aircraft		

Analysis

While on the right downwind leg, the flight crew advised the air traffic control tower controller that they would make a full stop landing. The tower controller acknowledged, told them to extend their downwind, and stated that he would call their base turn. The controller then called out the landing traffic on final, which was an Airbus A300-600 heavy airplane. The flight crew replied that they had the traffic in sight, and the controller cleared the flight to land behind the Airbus, and to be cautious of wake turbulence. The flight crew observed the Airbus abeam their current position and estimated that they made their base turn about 3 miles from the runway. Before turning onto final approach, the flight crew discussed wake turbulence avoidance procedures and planned to make a steeper approach and land beyond the Airbus's touchdown point. They also added 10 to 15 knots to the Vref speed as an additional precaution against a wake turbulence encounter. The reported wind provided by the tower controller was 180 degrees at 4 knots. The flight crew observed tire smoke from the Airbus as it touched down and discussed touching down beyond that touchdown point. The tower controller advised the flight crew to be prepared for a go-around if the Airbus did not clear the runway in time, which the flight crew acknowledged. The flight crew estimated that the Airbus had turned off the runway when their airplane was about 1,000 feet from the threshold and about 200 feet above ground level (agl). The flight crew reported having a stabilized approach to their planned landing point. When the airplane was about 150 feet agl and established on the runway centerline, the airplane experienced an uncommanded left roll. The heading swung to the left and the nose dropped. The crew reported that the airplane was buffeting heavily. Immediately, they set full power, and the flying pilot used both hands on the control wheel in an attempt to roll the airplane level and recover the pitch. He managed to get the airplane nearly back to level when the right main gear struck the ground short of the threshold and left of the runway. The airplane collided with a small drainage ditch and a dirt service road, causing the right main gear and the nose gear to collapse.

Videos from cameras at the airport recorded the accident sequence, and the accident airplane was about 51 seconds behind the Airbus.

A wake vortex study indicated that the accident airplane encountered the Airbus's right vortex, and the airplane's direction of left roll was consistent with the counter-clockwise rotation of the right vortex.

Probable Cause and Findings

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

The flight crew's decision to fly close behind a heavy airplane, which did not ensure there was adequate distance and time in order to avoid a wake turbulence encounter with the preceding heavy airplane's wake vortex, which resulted in a loss of airplane control during final approach.

Findings

Personnel issues	Decision making/judgment - Flight crew
Aircraft	(general) - Not attained/maintained
Environmental issues	Wake turbulence - Contributed to outcome

Factual Information

History of Flight

Approach-VFR pattern final	Aircraft wake turb encounter (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On December 21, 2012, about 1000 central standard time, a Cessna 550 Citation airplane, N753CC, impacted terrain while on approach to runway 17L at the Will Rogers World Airport (OKC), near Oklahoma City, Oklahoma. The pilot was uninjured and the copilot sustained minor injuries. The airplane sustained substantial wing and fuselage damage. The airplane was registered to and operated by the United States Customs Service under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as a public use flight. Day visual flight rules (VFR) conditions prevailed for the flight. The local flight originated from OKC about 0920.

According to the operator's report, the purpose of the flight was a local VFR training flight. The crew consisted of two flight instructor pilots; one who was current and qualified in the airplane and the second pilot who was qualified but out of currency. This was to be a training flight for the pilot under instruction (PUI) to reset his currencies so he could attend re-current training. The PUI had recently returned from a 12-month military deployment and had not flown for more than a year.

The crew's preflight activities were described as routine. They attended the morning crew briefing, checked weather and notices to airmen, completed their pre-mission paperwork, and completed the preflight of the airplane together. The weather was forecast to be VFR conditions throughout the day.

The airplane departed OKC on runway 17L, VFR westbound and climbed to 12,500 feet above mean sea level (msl). The flight instructor was the pilot not flying (PNF) and sat in the left seat; the PUI was the pilot flying (PF) from the right seat. The PF completed a series of normal stalls and steep turns, then requested vectors back to OKC for a practice instrument landing system (ILS) approach on runway 17L followed by pattern work. The PF flew the practice ILS, and then made two touch-and-go landings. The PNF described PF's performance up to this point as being above average for someone who had not flown in a year and his approach and landings were described as excellent.

While on the right downwind leg, the crew advised the air traffic control (ATC) tower that they would make a full stop landing. ATC acknowledged, told them to extend their downwind leg, and stated that the controller would call their base turn. The controller then called out the landing traffic that was currently on final approach, which was an Airbus A300-600 heavy. The flight crew replied back that they had the traffic in sight, and the controller cleared the flight to land, number two behind the preceding Airbus, and advised to have caution for wake turbulence. The crew observed their position was abeam the Airbus and estimated that they made the base turn about three miles from the runway. While making the turn, the flight crew discussed wake turbulence avoidance procedures and planned to make a steeper approach and land beyond the Airbus's touchdown point. The PF added 10 to 15 knots to the Vref speed as a precaution. The reported winds provided by the tower controller were 180 degrees at 4 knots. The crew observed tire smoke from the Airbus as it touched down near the 1,500-foot runway markings. The flight crew discussed touching down at the 2,000-foot markings and continued. The

Airbus continued on the runway, and the tower advised the Citation flight crew to be prepared for a go-around, should the Airbus not clear the runway in time, which the flight crew acknowledged. The flight crew estimated that the Airbus turned off the runway on taxiway F when they were about 1,000 feet from the threshold and about 200 feet above ground level (agl). The flight crew reported having a stabilized approach, and elected to continue while maintaining their planned landing point. When landing was assured, the PF reduced the power levers.

The operator indicated that when the airplane was approximately 150 feet agl, established on runway centerline, it had an uncommanded left roll to 60 degrees of bank or beyond. The heading swung to the left to about 130 degrees and the nose dropped. The flight crew reported that the airplane was buffeting heavily and that they momentarily lost sight of the horizon. Immediately, the PNF set full power and the PF used both hands on the control wheel in an attempt to roll the airplane level and recover the pitch. The PF managed to get the airplane nearly back to level when the right main landing gear struck the ground short of the threshold and left of the runway. Less than 50 feet after the right main landing gear had touched down, the airplane collided with a small drainage ditch and a dirt service road, causing the right main and the nose gear to collapse. The airplane skidded across a grassy area, across a taxiway, and before it came to rest it "ground looped" to the right in the infield between the taxiway and runway. A small ground fire had begun in the grassy area beyond the taxiway. The flight crew checked each other and immediately evacuated the airplane through the main cabin door. Upon exiting, they observed fuel pouring out of a hole in the left wing and elected to get a safe distance away from the airplane. The PNF had no injuries; the PF was taken to the hospital and treated for back pain.

The pilot flying an Air Force T-1 Jayhawk airplane, which was trailing the accident airplane, saw the accident sequence. He indicated that he had begun timing for wake turbulence as soon as the Airbus crossed the runway threshold and never visually acquired the Citation other than on the airplane's traffic collision avoidance system (TCAS). Based on TCAS, the Citation was about 3 miles in front of the T-1 and about 900 feet below the T-1's altitude. When the T-1 was about 4 miles from the threshold of the runway, the tower controller advised the Citation to expect a go-around. Shortly after this call, he visually acquired the Citation that was on short final as the wings rolled "nearly vertical," allowing the sun to be reflected in a "wing flash". He saw that the Citation subsequently impacted terrain short and slightly left of the runway striking right wing first. It then cart wheeled and stopped upright on a northwesterly heading. He also saw smoke, dust and debris, and flames/sparks upon impact. The T-1 was about three to four miles out on final at this point and was "coming up on (or shortly past)" the flight's two minute interval time for wake turbulence. The pilot estimated that the Citation was about a minute or less behind the Airbus and was on a low final based on the T-1's TCAS indications. The Airbus was just turning off the runway as the Citation was approaching about a 1/2 to 1/4 mile final at 100 to 200 feet when it encountered the wake. The T-1 pilot stated that, after the crash, the T-1's crew began a go-around and were subsequently given ATC instructions to go-around. On the go-around, the pilot noticed the Citation's airframe was still intact and he did not notice any post-impact fire.

Video cameras at the airport recorded the accident sequence. A video showed the accident airplane following approximately 51 seconds behind an Airbus airplane landing on the same runway. The video showed the accident airplane rolled left to about a bank angle of 60 degrees and a heading of approximately 140 degrees before recovering to a right-wing-low, nose-down attitude and impacting terrain. The right wing fuel tank ruptured, the airplane skidded along grass, crossed an airport perimeter road, crossed taxiway hotel, and came to rest upright near a parking lot along the east side of runway 17.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	Age:	49
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	3-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	Toxicology Performed:	No
Medical Certification:	Class 2 With waivers/limitations	Last FAA Medical Exam:	May 8, 2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	June 13, 2012
Flight Time:	5097 hours (Total, all aircraft), 420 hours (Total, this make and model), 4482 hours (Pilot In Command, all aircraft), 80 hours (Last 90 days, all aircraft), 28 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	Age:	41
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	3-point
Instrument Rating(s):	Airplane; Helicopter	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	Toxicology Performed:	No
Medical Certification:	Class 2 Without waivers/limitations	Last FAA Medical Exam:	December 20, 2012
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	October 12, 2011
Flight Time:	357 hours (Total, this make and model)		

Pilot Not Flying

The 49-year old pilot, who was seated in the left seat, held a Federal Aviation Administration (FAA) airline transport pilot certificate with a multiengine land rating with commercial pilot privileges for single engine land airplanes. He held a Cessna 500 type rating and a certified flight instructor rating with single-engine, multiengine, and instrument airplane ratings. According to the operator's report, the pilot had accumulated 5,097 hours of total flight time and 420 hours of flight time in the same make and model as the accident airplane. The pilot held a second-class medical certificate with a limitation for corrective lenses.

Pilot Flying

The 41-year old co-pilot, who was seated in the right seat, held a FAA airline transport pilot certificate with a multiengine land rating with commercial pilot privileges for single engine land airplanes and rotorcraft and instrument helicopters. He held Cessna 500 and Beechcraft 200 type ratings and a certified flight instructor rating with single-engine, multiengine, and instrument airplane ratings.

According to the operator's report, the pilot had accumulated 357 hours of flight time in the same make and model as the accident airplane. The pilot held a second-class medical certificate without limitations.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N753CC
Model/Series:	550	Aircraft Category:	Airplane
Year of Manufacture:	1980	Amateur Built:	
Airworthiness Certificate:	Transport	Serial Number:	550-0109
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	April 23, 2012 Continuous airworthiness	Certified Max Gross Wt.:	14600 lbs
Time Since Last Inspection:		Engines:	2 Turbo fan
Airframe Total Time:	13506 Hrs at time of accident	Engine Manufacturer:	P&W Canada
ELT:	C126 installed, activated, did not aid in locating accident	Engine Model/Series:	JT15D-4
Registered Owner:		Rated Power:	2500 Lbs thrust
Operator:		Operating Certificate(s) Held:	None

N753CC, a Cessna model 550 (Citation), with serial number 550-0109, was a twin-engine, turbojet airplane. The airplane was configured to seat four occupants. The transport category airplane was powered with two Pratt & Whitney Canada JT-15D-4 turbofan engines, serial numbers PCE-71690 and PCE-70313, each capable of producing 2,500 pounds of thrust. The operator reported that the airplane was maintained under an annual inspection program and its most recent continuous airworthiness inspection was completed on April 23, 2012, when the airplane accumulated 13,506 hours of total time.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KOKC, 1304 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	09:52 Local	Direction from Accident Site:	214°
Lowest Cloud Condition:	Scattered / 25000 ft AGL	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	190°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.36 inches Hg	Temperature/Dew Point:	4° C / -8° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Oklahoma City, OK (OKC)	Type of Flight Plan Filed:	None
Destination:	Oklahoma City, OK (OKC)	Type of Clearance:	VFR
Departure Time:	09:00 Local	Type of Airspace:	

A National Transportation Safety Board (NTSB) senior meteorologist produced a meteorology group chairman's report for the investigation. His report indicated that a surface analysis chart for 0900 on December 21, 2012, depicted a col or neutral zone centered over Oklahoma with a weak pressure gradient over the area, with resulting light winds. No boundaries were identified over the area to result in any significant low-level wind shear or shifting wind surrounding the period.

The station models depicted light southerly wind with no significant weather depicted over the area. The regional radar mosaic did not depict any meteorological echoes over the region and the convective outlook indicated no organized thunderstorms were expected across the area.

A constant pressure charts for 0600 on December 21, 2012, indicated that Oklahoma was located behind or west of an upper level trough with general convergence aloft and subsiding motion over the region. The station model over Oklahoma City depicted warm low-level conditions with a freezing level above 8,000 feet.

At 0952, the recorded weather at OKC was: Wind 190 degrees at 7 knots; visibility 10 statute miles; sky condition scattered clouds 25,000 feet; temperature 4 degrees C; dew point -8 degrees C; altimeter 30.36 inches of mercury. No wind gusts were noted and no significant variations in the wind field were noted surrounding this period.

The 0600 upper air sounding from Norman, Oklahoma depicted a defined surface based temperature inversion to approximately 1,166 feet agl with another inversion above. The atmosphere was stable and dry and did not support any significant cloud growth.

Satellite imagery did not depict any significant clouds or boundaries surrounding the period.

Weather radar in the Norman, Oklahoma, area was operating in the clear air mode during the period and depicted no meteorological echoes or boundaries over the area during the period. It did depict false

echoes associated with ground clutter from a strong inversion.

The terminal aerodrome forecast for OKC predicted light southerly wind over the airport at nine knots with no significant weather surrounding the period. No significant icing, low-level turbulence, low-level wind shear, or icing conditions were expected over the area and no advisories were current. The meteorologist's report is appended to the docket associated with this investigation.

Airport Information

Airport:	WILL ROGERS WORLD OKC	Runway Surface Type:	Concrete
Airport Elevation:	1295 ft msl	Runway Surface Condition:	Dry
Runway Used:	17L	IFR Approach:	None
Runway Length/Width:	9802 ft / 150 ft	VFR Approach/Landing:	Full stop;Traffic pattern

OKC, located approximately nine miles southwest of downtown Oklahoma City, Oklahoma, was a certificated airport under 14 CFR Part 139. It was owned by The City of Oklahoma City, Oklahoma (City). The Oklahoma City Airport Trust, a public trust whose sole beneficiary is the City, leases, operates, manages, and holds title to airport property in trust for the City. OKC's field elevation was 1,295 feet above mean sea level. Its class C airspace had continuous air traffic control services. The airport supported aircraft rescue and firefighting index C requirements.

OKC had 4 runways: runway 17L/35R - 9,802 feet by 150 feet, concrete/grooved; runway 17R/35L - 9,800 feet by 150 feet, concrete/grooved; runway 13/31 - 7,800 feet by 150 feet, asphalt/concrete/grooved; runway 18/36 - 3,078 feet by 75 feet, asphalt.

Runway 17L was marked as a precision approach runway and had high intensity runway edge lights. It was not serviced by any visual approach path system. The runway had MALSR (medium intensity approach lighting system with runway alignment indicator lights) approach lighting and centerline lighting.

Wreckage and Impact Information

Crew Injuries:	1 Minor, 1 None	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Minor, 1 None	Latitude, Longitude:	35.404167,-97.588607(est)

A FAA inspector along with a safety investigator from Cessna examined the wreckage after it was recovered to a ramp area at OKC. The left wing tip exhibited abrasions on its lower surface and was bent upward. The left wing leading edge exhibited an impact dent about three feet

outboard of the fuselage similar in shape to the nose landing gear tire. The left trailing edge flap was extended. The right lower fuselage nose area exhibited impact witness marks and the nose section was buckled upward. The right wing leading edge was punctured about one foot outboard of the fuselage. The outboard right wing section was bent upward and its fuel tank was compromised. The right wingtip lower surface exhibited abrasion damage and was bent upward. The right aileron was bent upward near its mid-span. The right flap trailing edge upper skin separated from the airplane. The right horizontal stabilizer leading edge was dented mid-span. The right elevator trailing edge exhibited impact damage. The aileron trim tab was near neutral. The elevator trim tab was near neutral. The rudder trim tab was deflected to the left. The speed brakes were retracted. The nose and right main landing gear separated from the airplane. The right engine fan exhibited foreign object debris witness marks on its blades. The aft fuselage was twisted and its skin was wrinkled near the engines. The airplane was outfitted with four cabin seats, which remained attached to the seat tracks. The pilot and copilot seat's three-point safety restraint systems were intact. The area around the rudder pedals was pushed upward and rearward. The left and right altimeters' Kollsman window indicated an altimeter setting of 30.36. The flap and landing gear controls were in the extended position and brake anti-skid was on. The flap position indicator was near the extended position. The elevator trim indicator was near neutral. The on-scene examination and subsequent disassembly of the airplane did not reveal any preimpact anomalies that would have precluded normal operations.

Additional Information

The instructor pilot in the T-1 reported that the ATC tower told the crew they were behind a heavy Airbus and were number two for the runway. The instructor stated that his student pilot requested a 360-degree turn to build spacing, which was granted as requested. Following the 360-degree turn, the tower cleared the flight for the visual straight in approach. The tower indicated that the flight was now number three for the runway behind the Airbus airplane and cleared the Citation behind the Airbus.

According to the operator, the agency's flight training included wake turbulence training. However, following the accident, the operator increased the structure of their wake turbulence training, in part, to include:

- Developing new wake turbulence procedures to be incorporated into their Office of Air and Marine's (OAM) Air Operations Handbook (AOH)
- Developing new wake turbulence training procedures to be incorporated into OAM's Aircrew Standardization Manuals (ASM)
- Incorporating two new slides outlining new wake turbulence procedures into our training materials, which are discussed during training
- Posting a front page Quarterly Special Emphasis Item banner on wake turbulence in the Opstar web portal
- Produced a Quarterly Special Emphasis Item, which is required to be completed and documented in pilots' training folders
- Developed a Wake Turbulence awareness video that will be

disseminated to all OAM personnel via OAM's website and OpSTAR

- Delivering human factors training and crew resource management training to all instructor pilots at the National Air Training Center by a FAA contractor

Flight recorders

The airplane was equipped with an enhanced ground proximity warning system (EGPWS) that provided aural and visual alerts and warnings to prevent controlled flight into terrain and for low altitude windshear conditions. The accident airplane's model was a Honeywell MK VIII EGPWS with serial number 0967.

The accident model VIII took inputs from airplane sensors and systems such as, the air data inertial reference unit, weather radar, GPS, and radio altimeter to calculate projected position and potential collision with nearby terrain. Audio alerts messages will sound over the flight deck speakers and visual warnings will appear on the electronic flight indication system to the flight crew if a potential collision is detected.

An EGPWS is designed to protect against seven different scenarios categorized by modes. Mode 1 is excessive descent rate, Mode 2 is excessive closure to terrain, Mode 3 is altitude loss after takeoff, Mode 4 is unsafe terrain clearance, Mode 5 is excessive deviation below glideslope, Mode 6 is advisory callouts, and Mode 7 is windshear protection. Each mode has soft and hard limit alert criteria with the hard limit requiring more urgent attention by the crew.

The accident model is designed to record events triggered by exceeding the hard and soft limits set by the device. Once a limit has been exceeded, a new event will be recorded at one sample per second that includes 20 seconds before and 10 seconds after the exceedence. The EGPWS parameters are sampled one time per second, but the actual time of occurrence can be anywhere within the second. Each record is identified by the unit's operating time, the mode that was exceeded, and a unique flight number from the device. A status log is also recorded that contains each landing and takeoff.

Medical and Pathological Information

The toxicological samples from the PNF were collected and tested. The results were negative for the tests performed.

Tests and Research

The EGPWS download was performed by its manufacturer with oversight by NTSB staff. The downloaded files were sent to a vehicle recorder specialist in the NTSB Vehicle Recorder Laboratory for subsequent analysis. According to the vehicle recorder specialist's factual report, the total operating time of the device was 494:44:55. Each power cycle was tagged with a sequential flight leg number. The accident event was identified as flight number 1420 with a bank angle and terrain clearance exceedance at the recorded operating times of 494:20:21 and 494:20:28, respectively.

Correlation of the EGPWS data from unit operating time to central standard time was established using ATC radar data. The radar data was overlaid against the EGPWS data in Google Earth. The location at ATC time of 11:59:03 was aligned with the similar EGPWS location at 494:20:01 EGPWS Operating Time. Accordingly, 478:20:58 was subtracted from EGPWS operating time to convert to local time.

The accident flight's recorded EGPWS data was plotted. A plot contained basic airplane parameters such as airplane attitudes, airspeed, altitude, and system discrete conditions. It showed the bank angle exceedance occurs at 11:59:23, with a roll to the left of 59.1 degrees. The terrain clearance exceedance occurs at 11:59:30, with a GPS altitude of 1,326 feet. The vehicle recorder specialist's EGPWS factual report is appended to the docket associated with this investigation.

A NTSB senior transportation safety specialist produced an ATC specialist's report. The report included ATC radar data and ATC audio recordings from the OKC airport traffic control tower and its terminal radar approach control. The recorded data was consistent with the accident flight crew's report. The ATC specialist's report is appended to the docket associated with this investigation.

A NTSB aircraft performance national resource specialist produced an aircraft performance wake vortex study. This study included data from OKC airport surveillance radar, EGPWS data, the NASA Langley Aircraft Vortex Spacing System Predictor Algorithm (APA), meteorological information, and aerodynamic considerations. The study's calculated results indicated that the location of the Airbus' right vortex after one minute supports an encounter with the accident airplane, and its direction of roll (to the left) is consistent with the counter-clockwise rotation of the right vortex (as viewed from behind). The study is appended to the docket associated with this investigation.

Administrative Information

Investigator In Charge (IIC):	Malinowski, Edward
Additional Participating Persons:	Weeg Castello; Federal Aviation Administration; Oklahoma City, OK Jan R Smith; Cessna; Wichita, KS Will Sibra; U.S. Customs and Border Protection; Grand Forks, ND Bill Gill; Honeywell; Olathe, KS
Original Publish Date:	April 10, 2014
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=85888

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](#).