



National Transportation Safety Board Aviation Accident Final Report

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|--------------------------------|--------------------------------------|-------------------------|------------|
| Location: | Corona, CA | Accident Number: | LAX03FA147 |
| Date & Time: | 05/04/2003, 1453 PDT | Registration: | N1133S |
| Aircraft: | Cessna 411 | Aircraft Damage: | Destroyed |
| Defining Event: | | Injuries: | 1 Fatal |
| Flight Conducted Under: | Part 91: General Aviation - Personal | | |

Analysis

The pilot lost control of his twin engine airplane and collided with terrain while returning to the departure airport after reporting an engine problem. Shortly after takeoff, about 4,000 feet msl, the pilot reported to ATC that he had an engine problem and would return to the airport. The radar plot reveals a steady descent of the airplane from 4,000 feet msl to the accident site, approximately 2 miles from the designated airport. Ground witnesses reported that they saw the airplane flying very low, about 500 feet agl, seconds prior to the accident apparently heading toward the departure airport. The witnesses reported consistent observations of the airplane "wobbling," then going into a steep knife-edge left bank before it dove into the ground. Witnesses at the airport said that the pilot sought out help in getting his radios operating prior to takeoff, telling the witness, "its been four and a half months since I've been in an airplane, I can't even figure out how to put the radios back in." No fueling records were found for the airplane at the departure airport. The last documented fueling of the airplane was on October 31, 2002, with the addition of 56.2 gallons. Witnesses reported that the airplane did not take on any fuel immediately prior to the flight on May 4th. The flight was the first flight since the airplane received its annual inspection 2 months prior to the accident, and, it was the pilot's first flight after 4 months of inactivity. It is a common practice for maintenance personnel to pull the landing light circuit breakers during maintenance to prevent the fuel transfer pumps, which are wired through the landing light system, from operating continuously. The fuel transfer pumps move fuel from the forward part of the main fuel tank to the center baffle area where it is picked up and routed to the engine. It is conceivable that these circuit breakers were not reset by the pilot for this flight. Wreckage examination revealed a post accident fire on the right wing of the airplane and no fire on the left wing. Additionally, only a small amount of fuel was identified around the left wing tanks after the accident, and no hydraulic deformation was observed to the left main tank or the internal baffles. The landing gear bellcrank indicates that the landing gear was in the down position. The engine and propeller post impact signatures indicate that the left engine was operating at a low power setting (wind milling), while the right engine and propeller indicate a high power setting. Disassembly and inspection of the internal propeller hub components showed that the left propeller was not feathered. The left engine is the critical engine and loss of power in that engine would make directional control more difficult at slower speeds. The airplane owners manual states that

"climb or continued level flight at a moderate altitude is improbable with the landing gear extended or the propeller wind milling." The single engine flight procedure delineated in the manual dictates a higher than normal altitude for a successful single engine landing approach.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot to properly configure the airplane for a one engine inoperative condition (including his failure to feather the propeller of the affected engine, retract the landing gear, and maintain minimum single engine speed). Factors related to the accident were fuel starvation of the left engine, due to an inadequate fuel supply in the left tanks, inoperative fuel transfer pumps, and the pilot's decision to takeoff with out fueling.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: CRUISE - NORMAL

Findings

1. 1 ENGINE
 2. (F) FUEL SUPPLY - INADEQUATE - PILOT IN COMMAND
 3. (F) IMPROPER DECISION - PILOT IN COMMAND
 4. (F) FUEL SYSTEM,PUMP - DISENGAGED
-

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

5. (F) PROPELLER FEATHERING - NOT PERFORMED - PILOT IN COMMAND
 6. (C) GEAR RETRACTION - NOT PERFORMED - PILOT IN COMMAND
 7. AIRCRAFT PERFORMANCE,ENGINE OUT CAPABILITY - EXCEEDED
 8. (C) AIRSPEED(VMC) - NOT MAINTAINED - PILOT IN COMMAND
-

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings

9. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On May 4, 2003, at 1453 Pacific daylight time, the pilot of a Cessna 411 twin engine airplane, N1133S, lost control and collided with terrain approximately 2 miles east of the Corona Municipal Airport, Corona, California. The pilot/owner was operating the airplane under the provisions of 14 CFR Part 91. The commercial pilot, who was the sole occupant, received fatal injuries. The airplane was destroyed. Day visual meteorological conditions prevailed, and no flight plan had been filed. The flight originated from the Corona airport around 1430, and was en route to Santa Monica, California.

According to Air Traffic Control (ATC) communications, and family members, the purpose of the flight was to deliver the airplane to Santa Monica Propeller for maintenance on one of the airplane's propellers. The pilot checked in with Southern California Approach (SoCal Approach) and requested flight following to Santa Monica. Approximately 3 minutes after checking in with SoCal approach, the pilot reported having engine difficulties and was returning to Corona. SoCal approach assisted the pilot with vectors to Corona Airport. SoCal approach lost radar contact with the airplane approximately 3 miles to the east of Corona Airport. So Cal approach advised loss of radar contact then instructed the pilot to change to the airport advisory frequency, which the pilot acknowledged.

The airplane flew over several witnesses who were within 1/2 mile of the accident site. They reported to the National Transportation Safety Board investigator-in-charge (IIC) that they observed the airplane flying "very low," about 300 to 500 feet msl. The airplane was heading toward the Corona airport. The witnesses reported consistent observations of the airplane "wobbling," then going into a steep knife-edge left bank before it dove into the ground. The wreckage was immediately located by police and fire rescue crews who extinguished a fire on the right side of the airplane.

PERSONNEL INFORMATION

The pilot obtained his third-class medical certificate on March 25, 2002. His medical was valid with no limitations.

Examination of the pilot's logbook and Federal Aviation Administration (FAA) records revealed the pilot received his commercial pilot certificate, single engine land, and instrument ratings through military competency on May 4, 1960. He received his multiengine land rating on May 17, 1999. The pilot had accumulated about 4,899 total flight hours with approximately 412 hours in the Cessna 411.

In the Riverside Automated Flight Service Station re-recording of the pilot requesting a weather brief, the pilot can be heard to say in a side conversation while he was waiting for a briefer, "Thank you very much for coming and helping I,...its been four and a half months since I've been in an airplane, I can't even figure out how to put the radios back in."

AIRCRAFT INFORMATION

The twin engine, low wing airplane was powered by two Teledyne Continental GSTIO-520-C engines. The airplane's serial number was: 411-0202. The airplane and engines underwent their last annual inspection on March 19, 2003, at an aircraft total time of 4,915 hours, and 86.5 hours since the last inspection in 2002. The total time since the last engine overhaul was

503 hours on the right engine and 563 hours on the left engine.

An aircraft logbook entry dated March 19, 2003, indicated the aircraft annual inspection was completed; however, the left propeller did not comply with AD 95-24-05 RI: "The propeller must be inspected by a certified person. Completion of AD 95-24-05RI will make the aircraft airworthy."

The mechanic who performed the last annual inspection provided copies of his discrepancy notes pertaining to the accident airplane to the Safety Board IIC. In those documents it is noted that the left propeller was leaking red dye.

According to Corona Aircraft Sales, the airplane had been placed on their sales lot to be sold. The airplane had not been flown since the completion of the annual inspection.

AIR TRAFFIC CONTROL AND RADAR DATA

Review of the Air Traffic Control (ATC) communications re-recording and radar plot data revealed that the pilot had been in communications with Southern California Approach. Upon initial contact with SoCal approach the airplane was observed by the controller to be heading east, away from Santa Monica. When the controller queried the pilot, the pilot said his GPS indicated he was heading the correct direction. The controller informed the pilot that he was heading east when Santa Monica was to the west, and gave the pilot an appropriate heading towards his stated destination. Approximately 3 minutes 15 seconds after initial contact with SoCal approach, and at an altitude of 4,000 feet, the pilot reported an "engine cutting out" and intended to return to Corona airport. The SoCal approach controller observed the airplane descend in altitude, assisted the pilot with vectors to Corona Airport, and expressed concern about the airplane's ability to maintain altitude. The pilot reassured the controller that he could maintain altitude. Approximately 3 miles east of Corona airport the controller reported that radar contact was lost and to switch to the airport advisory frequency. The pilot acknowledged this last communication.

Radar and radio communication re-recordings and data files were obtained from Southern California TRACON and a plot was generated by a private vendor for the Cessna Aircraft Company. A copy of the plot and communication transcripts is attached to this report. It shows the aircraft departing Corona airport, climbing to 4,000 feet, turning back towards Corona, and continuously descending until radar contact is lost at about 700 feet agl and 85 knots ground speed.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was located in a construction site on a small plateau approximately 30 feet above River Road to the east. The dirt plateau falls away into a drainage culvert approximately 75 feet below to the north. The construction site was barren of all trees and brush. The plateau had an approximate 20-degree slope downwards to River Road. The wreckage location was recorded with a global positioning system as latitude north 33 degrees 53.794 minutes, longitude west 117 degrees 34.275 minutes at an elevation of 590 feet.

All major components of the airplane were present at the accident site. The airplane was oriented on a bearing of 310 degrees magnetic. The airplane was laying upright with the landing gear collapsed underneath the fuselage. The nose, flight deck, and instrument panel of the airplane were completely destroyed. The engine control quadrant; throttle, propeller, and mixture control levers were all found parallel, in the full forward position. The circuit breaker

panels had pulled apart. Most circuit breakers were popped or broken, posts sheared, and extended out of position.

The right wing exhibited fire damage outboard of the right engine. The entire right engine was twisted 90 degrees along its longitudinal axis so that the engine cylinders were directed vertically. The crankshaft propeller flange exhibited torsional shearing and the propeller was not attached to the engine. The right wing leading edge and fuel tip tank were crushed aft to the wing spar and thermally damaged. The right aileron was consumed by fire but the aileron spar was attached to its respective hinge points. The right aileron flight control cables were present and attached to the aileron bellcrank and push rod, which connect to the aileron.

The right side of the fuselage was split along an upper longitudinal rivet line and laying open from aft of the upper corner of the emergency exit to the leading edge of the horizontal stabilizer.

The last outboard quarter of the right horizontal stabilizer had a 20-degree bend upward. The rudder had skin wrinkles along the rivet line that extends horizontally from the upper hinge. The left horizontal stabilizer and elevator displayed no apparent damage.

The left side of the fuselage was split aft horizontally along a lower rivet line from the bottom corner of the main cabin door. The top half of the split cabin door was jarred open. The bottom half of the cabin door was detached, and found laying on the ground 3 feet in front of the doorframe location, but remained attached to the airplane by its chain handrail.

The left wing was attached to the fuselage. The engine had detached from the firewall and was laying on top of the wing with a pivot point at the outboard intersection of the nacelle and wing leading edge. The propeller remained attached to the engine. The section of the wing outboard of the nacelle exhibited leading edge crushing and deformation. This section was also twisted about the wing spar upward approximately 110 degrees and passed through the vertical plane. The wing tip fuel tank was detached and located 30 feet from the wing tip. The wing tip tank had a softball sized hole in the forward section. Dirt beneath the tip tank hole had a slight gasoline odor. Neither the wing tip tank nor the interior baffle of the tank exhibited any evidence of hydraulic deformation.

The left propeller blades exhibited aft bending and slight chordwise scratches. The spinner was crushed aft without torsional twisting and with folds that paralleled the aft face of the spinner.

The right propeller was located approximately 7 feet from the right wing tip in line with the lateral axis of the airplane. The spinner, hub, and blades were buried about 12 inches into the ground, which formed a cratered area 4 feet across. The blades exhibited chordwise scratching and trailing edge buckling, forming a sinusoidal type bend.

Witnesses reported seeing the airplane flying very low, approximately 500 feet agl, towards Corona airport

MEDICAL AND PATHOLOGICAL INFORMATION

The Riverside County Sheriff-Coroner conducted an autopsy on the pilot. According to the coroner's report, the pilot died of multiple blunt force traumatic injuries and no preaccident anomalies were noted.

A toxicology test for ethanol and drugs were negative.

TESTS AND RESEARCH

Airframe:

The flap drive gears attached to the flap motor were observed at the aft sprocket with flap drive chain running to the left wing showing 2-3 chain links extended on top. The forward sprocket with the flap drive chain running to the right wing showed 2 chain links extended from the bottom. The Cessna 411 service manual states that this corresponded to the flaps retracted position.

Control cables were traced from the elevator, rudder, and aileron control surfaces to the cockpit control column and rudder pedals. The control cables were found attached to their respective control arms and control surfaces. The elevator trim actuator was measured extended 1.25 inches.

The two fuel selector valves for the left and right main fuel tanks corresponded to the cockpit fuel selector positions, which were set at the left and right main fuel tank positions.

Approximately 4 ounces of fuel was collected from the left fuel selector valve. One bead of water was present. Approximately 2 ounces of fuel was collected from the right fuel selector valve with no water evident. Approximately 1/8 ounce of fuel was observed in the left engine fuel manifold valve. No fuel was found in the right engine fuel manifold valve. All fuel filler cap rubber o-rings were present and displayed a degree of flexibility with no apparent cracks.

Both fuel pumps, the auxiliary fuel pump, and fuel transfer pump from each main tank were removed and examined. The right wing fuel pumps were thermally damaged by fire and not functional but electrical connections were observed intact on both units. The left wing fuel pumps appeared to be in good condition with intact electrical connections and were tested for operation. The left auxiliary pump and fuel transfer pumps were wired with an external power source and tested using water as a working fluid. The purpose of the test was to determine if the fuel pumps were capable of operating. The left auxiliary pump operated and produced approximately a flow rate of 2.4 gallons per minute. The left fuel transfer pump operated and produced a flow rate of approximately 0.3 gallons per minute.

A Cessna service letter dating June 27, 1967, directed the installation of wing tip tank fuel pumps intended to maintain a constant fuel supply at the wing tank fuel outlet at all times. This letter alerted the owners of possible fuel starvation during steep descents. The Cessna 411 service manual states that the purpose of these fuel transfer pumps "is to transfer fuel from the forward end of the main tanks to the center baffle area where it is picked up and routed to the engine by either the engine-driven pump or the auxiliary fuel pump." These pumps are powered from the landing light circuits. The mechanic who performed the aircraft's required annual maintenance mentioned that in order to keep the fuel transfer pumps from running continuously when power was on the airplane the mechanics would pull the landing light circuit breakers while performing maintenance.

The landing gear actuator upper bellcrank was aligned with the lateral axis. Per the Cessna 411 service manual, this position corresponds to the landing gear down position.

Engine control cables remained attached to their respective control arms, and the cables were traced to the appropriate engine component attach points.

Engines:

Both the left and right engines were sent to Teledyne Continental Motors, Mobile, Alabama, for teardown and evaluation under the supervision of the Safety Board IIC. According to Teledyne

Continental technicians, both engines exhibited normal operating signatures. All spark plugs were clean with no mechanical deformation. The spark plug electrodes were gray in color, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart. The magnetos were bench tested and produced sparks on all leads in firing order. Investigators manually rotated the engines. The engines rotated freely and the valves moved approximately the same amount of lift in firing order. Investigators obtained thumb compression on all cylinders in firing order. The fuel pump rotors turned freely, were unfractured with inner diaphragms, and rubber seals unbroken. The plunger in the fuel distribution valve moved freely, the rubber diaphragm was unbroken, and investigators did not observe any contamination. The oil sump screens were clean and open. The engines oil filters were examined and contained no metal debris. The governor screens were clean. The oil screen filters were clean. The fuel nozzles were open and the screens were clean.

Propellers:

Both propellers were sent to McCauley Propeller Systems, the manufacturer, for examination under supervision of investigators from the Safety Board. McCauley engineers concluded the following:

1. All propeller damage was the type associated with impact forces.
2. Feather stop mechanisms of each propeller were undamaged indicating mechanisms were not engaged at impact.
3. Counterweight impact marks found on the hub sockets of both propellers indicate that both propellers were operating near the low pitch range at impact.
4. Damage to the right propeller was extensive and included the break-up of the crankshaft flange indicating power at impact.
5. Left propeller overall damage was significantly less than that of the right propeller indicating lower energy (power) at impact.

ADDITIONAL INFORMATION

Fueling Information:

No fueling records were found at the Corona airport. The last location of the airplane prior to its arrival at Corona was Bermuda Dunes, California. Bermuda Dunes records show the airplane as fueled on October 31, 2002, taking on 56.2 gallons. Witnesses reported that the airplane did not take on any fuel immediately prior to the flight on May 4th..

Single Engine Flight Operations:

The "Airplane Flying Handbook" (FAA-H-8083-3) discusses the identification and the effects caused by a failure of the critical engine in a multiengine airplane.

"In most U.S. designed multiengine airplanes, both engines rotate to the right (clockwise) when viewed from the rear, and both engines develop an equal amount of thrust. At low airspeed and high-power conditions, the downward moving propeller blade of each engine develops more thrust than the upward moving blade. This asymmetric propeller thrust or P-

factor, results in a center of thrust at the right side of each engine as indicated by lines D1 and D2 in Figure 14-2. The turning (or yawing) force of the right engine is greater than the left engine since the center of thrust (D2) is much farther away from the centerline (CL) of the fuselage because it has a longer leverage arm. When the right engine is operative and the left engine is inoperative, the turning (or yawing) force is greater than in the opposite situation of an operative left engine and an inoperative right engine. In other words, directional control is more difficult when the left engine (the critical engine) is suddenly made inoperative."

The Cessna 411 Owners Manual (aircraft s/n 411-0161 and on) states:

"MINIMUM CONTROL SPEED. The twin-engine airplane must reach the minimum control speed (103 MPH) before full control deflections can counteract the adverse rolling and yawing tendencies associated with one engine inoperative and full power operation on the other engine."

"RECOMMENDED SAFE SINGLE-ENGINE SPEED. Although the airplane is controllable at the minimum control speed, the airplane performance is so far below optimum that continued flight near the ground is improbable. A more suitable recommended safe single-engine speed is 105 MPH, since at this speed altitude can be maintained more easily while the landing gear is being retracted and the propeller is being feathered."

"ENGINE INOPERATIVE APPROACH

- (1) Approach at 120 MPH with excessive altitude.
- (2) Landing Gear - EXTEND when within gliding distance of field.
- (3) Wing flaps - DOWN when landing is assured
- (4) Decrease speed below 110 MPH on if landing is assured
- (5) Minimum Single-Engine Control Speed - 103 MPH"

In a section addressing supplementary information concerning engine failures the owners manual states "climb or continued level flight at a moderate altitude is improbable with the landing gear extended or the propeller windmilling."

The wreckage was released to the owner on August 8, 2003.

Pilot Information

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|----------------------------------|---|--|----------------------------|
| Certificate: | Commercial | Age: | 68, Male |
| Airplane Rating(s): | Multi-engine Land; Single-engine Land | Seat Occupied: | Left |
| Other Aircraft Rating(s): | None | Restraint Used: | Seatbelt, Shoulder harness |
| Instrument Rating(s): | Airplane | Second Pilot Present: | No |
| Instructor Rating(s): | None | Toxicology Performed: | Yes |
| Medical Certification: | Class 3 Valid Medical--no waivers/lim. | Last FAA Medical Exam: | 03/25/2002 |
| Occupational Pilot: | | Last Flight Review or Equivalent: | 04/16/1999 |
| Flight Time: | 3901 hours (Total, all aircraft), 412 hours (Total, this make and model), 3901 hours (Pilot In Command, all aircraft) | | |

Aircraft and Owner/Operator Information

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|--------------------------------------|--|---------------------------------------|-----------------|
| Aircraft Make: | Cessna | Registration: | N11335 |
| Model/Series: | 411 | Aircraft Category: | Airplane |
| Year of Manufacture: | | Amateur Built: | No |
| Airworthiness Certificate: | Normal | Serial Number: | 411-0202 |
| Landing Gear Type: | Retractable - Tricycle | Seats: | 8 |
| Date/Type of Last Inspection: | 03/19/2003, Annual | Certified Max Gross Wt.: | 6500 lbs |
| Time Since Last Inspection: | 86.5 Hours | Engines: | 2 Reciprocating |
| Airframe Total Time: | 4915 Hours at time of accident | Engine Manufacturer: | Continental |
| ELT: | Installed, activated, did not aid in locating accident | Engine Model/Series: | GTSIO-520-C |
| Registered Owner: | Roger L. Maino | Rated Power: | 340 hp |
| Operator: | Roger L. Maino | Operating Certificate(s) Held: | None |

Meteorological Information and Flight Plan

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|----------------------------------|-------------------------|---|-------------------|
| Conditions at Accident Site: | Visual Conditions | Condition of Light: | Day |
| Observation Facility, Elevation: | KRAL, 818 ft msl | Distance from Accident Site: | 12 Nautical Miles |
| Observation Time: | 1453 PDT | Direction from Accident Site: | 20° |
| Lowest Cloud Condition: | Clear | Visibility | 10 Miles |
| Lowest Ceiling: | Broken / 3900 ft agl | Visibility (RVR): | |
| Wind Speed/Gusts: | 6 knots / | Turbulence Type Forecast/Actual: | / |
| Wind Direction: | Variable | Turbulence Severity Forecast/Actual: | / |
| Altimeter Setting: | 29.99 inches Hg | Temperature/Dew Point: | 19° C / 10° C |
| Precipitation and Obscuration: | | | |
| Departure Point: | Corona, CA (KAJO) | Type of Flight Plan Filed: | None |
| Destination: | Santa Monica, CA (KSMO) | Type of Clearance: | Traffic Advisory |
| Departure Time: | 1430 PDT | Type of Airspace: | Class C |

Airport Information

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|----------------------|------------------------|---------------------------|-----------------------|
| Airport: | Corona Municipal (AJO) | Runway Surface Type: | Unknown |
| Airport Elevation: | 533 ft | Runway Surface Condition: | Unknown |
| Runway Used: | NA | IFR Approach: | None |
| Runway Length/Width: | | VFR Approach/Landing: | Precautionary Landing |

Wreckage and Impact Information

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|---------------------|---------|----------------------|------------------------|
| Crew Injuries: | 1 Fatal | Aircraft Damage: | Destroyed |
| Passenger Injuries: | N/A | Aircraft Fire: | None |
| Ground Injuries: | N/A | Aircraft Explosion: | None |
| Total Injuries: | 1 Fatal | Latitude, Longitude: | 33.896667, -117.574167 |

Administrative Information

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|-----------------------------------|--|--------------|------------|
| Investigator In Charge (IIC): | Van S McKenny | Report Date: | 12/28/2004 |
| Additional Participating Persons: | Michael L Chittick; Federal Aviation Administration; Riverside, CA Mike J Grimes; Teledyne Continental Motors; Mobile, AL Robert S August; Cessna Aircraft Company; Wichita, KS Henry Soderlund; Cessna Aircraft Company; Wichita, KS | | |
| Publish Date: | | | |
| Investigation Docket: | NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ . | | |

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](#).