



National Transportation Safety Board Aviation Accident Final Report

Location:	Big Bear City, CA	Accident Number:	LAX02LA252
Date & Time:	08/13/2002, 1120 PDT	Registration:	N50BK
Aircraft:	Cessna S550	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	7 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

On a final approach to runway 26 the flight crew was advised by a flight instructor in the traffic pattern that a wind shear condition existed about one-quarter of the way down the approach end of the runway, which the flight crew acknowledged. On a three mile final approach the flight crew was advised by the instructor that the automated weather observation system (AWOS) was reporting the winds were 060 degrees at 8 knots, and that he was changing runways to runway 08. The flight crew did not acknowledge this transmission. The captain said that after landing smoothly in the touchdown zone on Runway 26, he applied normal braking without any response. He maintained brake pedal pressure and activated the engine thrust reversers without any response. The copilot said he considered the approach normal and that the captain did all he could to stop the airplane, first applying the brakes and then pulling up on the thrust reversers twice, with no sensation of slowing at all. Considering the double malfunction and the mountainous terrain surrounding the airport, the captain elected not to go around. The aircraft subsequently overran the end of the 5,860 foot runway (5,260 feet usable due to the 600 displaced threshold), went through the airport boundary fence, across the perimeter road, and came to rest upright in a dry lakebed approximately 400 feet from the departure end of the runway. With the aircraft on fire, the five passengers and two crew members safely egressed the aircraft without injuries before it was consumed. Witnesses to the landing reported the aircraft touched down at midfield, was too fast, porpoised, and was bouncing trying to get the gear on the runway. Passengers recalled a very hard landing, being thrown about the cabin, and that the speed was excessive. One passenger stated there was a hard bang and a series of smaller bangs during the landing. Federal Aviation Regulations allowed 3,150 feet of runway for a full stop landing. Under the weather conditions reported just after the mishap, and using the anticipated landing weight from the load manifest (12,172.5 pounds), the FAA approved Cessna Flight Manual does not provide landing distance information. Post-accident examination and testing of various wheel brake and antiskid/power brake components revealed no anomalies which would have precluded normal operations.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to obtain the proper touchdown point which resulted in an overrun. Contributing factors were the pilot's improper in-flight planning, improper use of performance data, the tailwind condition, failure to perform a go-around, and the pilot-induced porpoising condition.

Findings

Occurrence #1: OVERRUN

Phase of Operation: LANDING - ROLL

Findings

1. (F) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
2. (F) PERFORMANCE DATA - IMPROPER USE OF - PILOT IN COMMAND
3. (F) WEATHER CONDITION - TAILWIND
4. (F) GO-AROUND - NOT PERFORMED - PILOT IN COMMAND
5. (C) PROPER TOUCHDOWN POINT - NOT OBTAINED - PILOT IN COMMAND
6. (F) PORPOISE/PILOT-INDUCED OSCILLATION - ENCOUNTERED - PILOT IN COMMAND

Occurrence #2: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER

Phase of Operation: LANDING - ROLL

Findings

7. TERRAIN CONDITION - ROUGH/UNEVEN

Factual Information

HISTORY OF FLIGHT

On August 13, 2002, at 1120 Pacific daylight time, a Cessna S550 Citation twin-engine jet, N50BK, was destroyed while landing at the Big Bear City Airport (L35), Big Bear, California. The airplane was registered to Melita Eagle Inc., of Wilmington, Delaware, and was operated by Corporate Flight International, of Las Vegas, Nevada. The airline transport rated pilot, commercial pilot, and their five passengers were not injured. Visual meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan was filed for the 14 CFR Part 135 on-demand air-taxi flight. The cross-country flight originated from the McCarran International Airport (LAS), Las Vegas, Nevada, at 1038.

After departing LAS, the flight, operating as Vegas 850, climbed to FL220 for the 137 nautical mile trip. At 1101 and 43 nautical miles northeast of L35 (elevation 6,748 feet), the aircraft began a descent to 14,000 feet. At 1107 and 8 nautical miles north-northeast of L35, the pilot reported the airport in sight. Air Traffic Control (ATC) instructed the aircraft to squawk 1200 and change to the advisory frequency. The aircraft continued descending and turned to the east, then back to the west for a landing on runway 26. At 1110:45, the aircraft was at 9,400 feet mean sea level, 7 nautical miles from the airport and heading west toward L35. The last radar return at 1111:57, 3 nautical miles from the airport, indicated the aircraft descended to 7,700 feet mean sea level at an average rate of descent of 1,478 feet per minute and at an average groundspeed of 156 knots.

Approaching the airport, the Citation crew called for local traffic advisories. A certified flight instructor, who was in the traffic pattern practicing landings with a student to Runway 26, reported that he advised the Citation crew that a wind shear condition existed approximately one-quarter of the way down the approach end of the runway. The flight instructor said the Citation crew confirmed his transmission. On his downwind to runway 26 the instructor further advised the Citation crew that he would extend his downwind leg and let the Citation land first. The Citation crew acknowledged his radio call, confirming that they [the Citation] would land first. While the instructor pilot was downwind he stated that he observed the east and mid-field wind socks were indicating winds out of the east. He checked the Automatic Weather Observing System and noted the winds were 060 degrees at 8 knots. When the Citation was on an approximately 2 to 3 mile final approach to Runway 26, the instructor said he radioed the Citation crew that the winds had changed to 060 degrees at 8 knots and that he was changing to runway 08. The Citation crew did not acknowledge this transmission.

The aircraft subsequently landed on Runway 26 (5,260 feet usable) and overran the departure end of the runway. After overrunning the runway, the aircraft went through the airport boundary fence, across an airport perimeter road, and came to rest upright in a dry lakebed approximately 400 feet from the departure end of Runway 26. A post-impact fire ensued, after which all occupants exited the aircraft successfully through the main cabin door.

According to a statement supplied to the NTSB investigator-in-charge (IIC), the captain reported that prior to departure he and his first officer had determined that the flight could be made. The captain stated that during the descent the landing performance data was updated, he entered downwind for runway 26, and the approach was stable on the 4-degree glide path. The captain related that the airplane landed "smoothly" in the touchdown zone, normal braking was applied without any response, and that he maintained brake pressure and

activated the engine thrust reversers, but there was no response. The captain said he manipulated the thrust reverse handles, placing them in the closed position and confirming the throttles were in the idle position, then applied thrust reverse for a second time while applying brake pressure, still with no response. The captain said he immediately decided that aborting was not an option, given the double malfunction, the terrain surrounding the airport, the airport's elevation of nearly 7,000 feet, his five male passengers, and a temperature of between 78 and 80 degrees Fahrenheit. The captain stated that he applied reverse thrust a third time about two-thirds of the way down the runway, again with no response. The captain further said he opted not to activate the emergency brakes due to the steep runway shoulders and having no asymmetrical control or anti-skid capabilities. The captain reported the airplane went off the runway, up an embankment and hitting a fence which ripped into the wings resulting in a post-impact fire. The captain said he and the first officer assisted the five passengers out of the airplane and that there were no serious injuries.

In a statement provided to the IIC, the first officer reported that prior to landing the crew had figured their landing weight at just under 12,000 pounds, temperature of between 78 degrees and 80 degrees Fahrenheit, with a headwind of 9 to 16 knots, and 3,100 feet of runway required to land. The first officer said he considered the captain's approach "very normal," and that he was responsible for the speed brakes upon touching down. The first officer stated that he believed the captain did all he could to stop the airplane, first by applying the brakes, and then by pulling up on the thrust reversers. The first officer further stated that while the captain was "standing on the brakes," they had no sensation of slowing and he was pushing back on the speed brake hoping this would help them stop. The first officer said there was a 75-foot dirt overrun and then a fence about 8 feet tall off the end of the runway, and that the airplane probably caught on fire after hitting the fence. After the airplane came to a stop the first officer said he opened the door and everyone escaped.

Four of the five passengers submitted a Passenger Statement form (NTSB form 6120.9) to the IIC:

Passenger #1 reported that the flight was uneventful prior to the accident, but on approach over the top of the trees another passenger shouted "hang on guys." The passenger stated that there was a very hard bang and he hit his head to his left. He continued by saying another passenger seated behind him was thrown about more than anyone, and at one point "his head banged into my right upper arm, giving me a big black and blue mark." The passenger reported that after the first "bang" there was a series of "smaller bangs" and then a much harder "crash". He further stated that there was another series of smaller crashes before they stopped.

Passenger #2 reported that another passenger yelled out "we are going to miss the runway." He continued by saying the airplane slammed into a fence and bounced along until it came to a stop in a field. The passenger stated that after the co-pilot opened the door and exited the plane, the passengers evacuated in an orderly fashion.

Passenger #3 reported that he recalled a very hard landing and being thrown about the cabin because his seat belt was loose. After the airplane had stopped, he said he believed the airplane was on fire. The passenger reported that other passengers later told him that the wings had caught on fire when the plane went through the fence at the end of the runway.

Passenger #4 reported the landing appeared "regular" as they approached the runway, but

when the wheels touched down the aircraft jerked to the left significantly, but then appeared to come back in line with the runway as they began to roll. The passenger stated the speed seemed fast for the landing and it didn't decrease immediately. The passenger related "we slowed somewhat, but the speed was clearly excessive and was not decreasing as rapidly as one might expect. I was observing the entire landing from my seat through the cockpit window. I noticed that the end of the runway was fast approaching and noticed a black truck moving down the road perpendicular to the end of the runway. The pilot seemed to be trying to control the speed of the aircraft, but it was clear we were going too fast to stop. I told everyone to brace as soon as it was clear we were not going to stop at the end of the runway. We crashed through the fence and appeared to be launched over the roadway, which was about 30 yards beyond the fence at the end of the runway. We bounced violently and did a 'belly flop' on the fuselage as we skidded to a stop." The passenger also stated that the pilot touched down after approximately one-third of the runway had gone by. He also stated "it was difficult to tell if the wheels were actually on the ground or if we were still flying just above the runway. The pilot appeared to be having difficulty controlling the plane."

Seven witnesses to the accident provided statements to the IIC:

Witness #1, a certified airframe and power plant mechanic, reported that he and his wife were talking while standing in front of their hangar. The witness stated, "When the aircraft attempted to land on runway 26 he still had a very high rate of speed, and on touchdown the aircraft began to porpoise. Total number of cycles I did not count. The aircraft continued down the runway not slowing down at all. The TRs (thrust reversers) did not deploy until the last 1,000 feet of the runway. At that time they cycled at least 3 times, opened and closed. I don't believe they stayed open at the end of the last cycle." The witness reported the aircraft went off the end of the runway and through a fence where it exploded in flames, coming to a stop on the west side of the perimeter road.

Witness #2, the wife of witness #1, reported that she and her husband were standing in front of their hangar and that it was a perfect day with a warm, light breeze. The witness stated that when they heard the airplane approach they turned to watch. "We were facing east when the Cessna began landing. He touched down at midfield - he porpoised down the runway past our hangar very fast. At this point my husband yelled 'he won't make it' and ran. He grabbed the fire extinguisher and truck. I dialed 911 as the aircraft hit the fence and went across the road."

Witness #3, a certified flight instructor who was in the traffic pattern conducting an instructional flight with a student, reported that his first contact with the crew of the Citation was that he would be making a touch-and-go landing on runway 26, which the Citation crew acknowledged. The instructor stated that after completing the touch-and-go there was a wind shear approximately one-quarter of the way down the approach end of the runway. The wind sheared from the east to the west. On the downwind leg the instructor radioed and informed the Citation crew of the wind shear condition. The Citation crew acknowledged this transmission while they were on a long final approach and informed the instructor that he could land first. The instructor then informed the Citation crew that he would extend his downwind leg and let the Citation land first, which the Citation crew acknowledged. While on the downwind leg to runway 26, at the mid-field position, the instructor checked the windsocks. The east and mid-field windsocks were indicating winds out of the east. The instructor then checked the Automatic Weather Observing System (AWOS) and the winds were 060 degrees at 8 knots. The instructor reported that at this time the Citation was on an

approximately three mile final when he radioed that the winds had changed to an east wind and that he was changing to runway 08. The instructor stated there was no acknowledgement from the crew of the Citation. After the instructor completed a 180-degree turn for downwind to runway 08, he noticed the Citation was on a short final for runway 26, and seemed extremely fast. The instructor stated, "His touchdown point was about mid-field and appeared to be faster than normal. It appeared that he was going to try to turn left at the west taxiway but was too fast. The aircraft skidded off the end of the runway, through a fence, across the road and stopped in the dry lakebed. The fire started at the road and followed the aircraft to a stop."

Witness #4, a certified airframe and powerplant mechanic, reported that he was sitting in a pickup facing the runway when he observed an airplane landing. The witness stated the touchdown was at mid-field and the aircraft was bouncing trying to get the gear on the runway, with the engines throttled back and the thrust reversers not out "due to the gear not fully on the runway." The witness reported the aircraft ran off the end of the runway, through a fence, across a two lane road, blew up and was on fire, with the rear one-third of the left wing fully on fire and the right wing just starting to burn. The witness further reported that the aircraft came to rest upright facing the direction of intended landing.

Witness #5, a pilot, reported seeing the airplane landing on runway 26. The witness stated "...when it was two thirds down the runway [I]saw it was going way too fast to stop and way too slow to go around. At this point it was not fully on the runway and the engines were not spooled up for thrust reversal. My mechanic and I drove to where he went off the end to assist."

Witness #6, a backhoe operator, reported that he observed the airplane on final approach and "it looked to me that he was awful high and fast." The witness further stated that the aircraft proceeded to touch down past midfield, approximately at the "2nd turn" and began to porpoise up and down. The witness reported "I continued to observe the airplane and was listening for his reversers to engage and thought I heard them about the same time I saw the dust at the end of the runway. Seconds later I could see smoke."

Witness #7, an FAA Support Center Manager, reported that he observed a Cessna Citation landing on Runway 26 with full flaps extended, the landing gear down, and in a nose down attitude. The witness stated the it first crossed his mind that the Citation was too far down the runway to land and needed to execute a go-around. The witness further stated that approximately one-half to two-thirds of the way down the runway the airplane flared for landing, which caused it to climb, then the pilot pointed the nose of the aircraft down in what appeared to be an effort to force the landing. The witness said he then lost sight of the airplane as it went further down the runway, but heard the sound of reverse thrusters being applied. He then heard over the radio that the aircraft had overshoot the runway, at which time he looked to the west end of Runway 26 and saw a black cloud of smoke rising.

PERSONNEL INFORMATION

The captain held an airline transport pilot certificate with a rating for multiengine land, and commercial privileges for airplane single engine land. Additionally, the captain received his Citation type rating on October 22, 1997. The captain reported his total flight experience as 3,900 hours, 800 of which were in the Citation 550. He also reported that he accumulated 150 hours in the Citation 550 in the last 90 days.

The captain's most recent Federal Aviation Administration (FAA) first class medical certificate was issued on April 1, 2002, with no restrictions.

The captain was hired by the company in January of 2001. He completed his Cessna S550 airman competency/proficiency check on March 8, 2001, during which he received a "satisfactory" for all maneuvers and procedures demonstrated, as well as comments in the remarks section stating "excellent airmanship and situational awareness." His most recent competency check was performed on April 26, 2002 at Simu Flite, during which he received a "satisfactory" for all maneuvers and procedures demonstrated.

The first officer held a commercial pilot certificate with ratings for airplane and multiengine land and instrument airplane. The first officer's most recent first class medical certificate was issued on January 23, 2001, with no restrictions.

The first officer reported 1,600 hours of total flight experience, with 550 hours in make and model.

AIRCRAFT INFORMATION

Examination of aircraft records revealed the airplane's most recent inspection was performed on July 25, 2002, and the airplane had flown 8.8 hours since then. Both the left and right engines had a total time of 5,776.2 hours, 238 hours since their last inspection, and 1,978 hours since overhaul.

AIRPORT INFORMATION

Big Bear City Airport (L35), elevation 6,748 feet mean seal level, has one runway (08/26), 5,850' X 75'. Runway 26 has a displaced threshold of 600 feet, resulting in an available landing distance of 5,250 feet. A stand of trees 40 feet tall are located 1,000 feet from the displaced threshold of the approach end of Runway 26. A road and a 6-foot high fence are located 110 feet from the threshold and perpendicular to the centerline of the approach end of Runway 8 (departure end of Runway 26).

The most recent aviation facilities inventory and State permit compliance inspection of the Big Bear City Airport, prior to the date of the accident, was conducted by personnel from the California Department of Transportation, Division of Aeronautics, on October 29, 2001. As a result of the inspection the following items were brought to the attention of the Big Bear City airport manager:

Soil erosion along the side of the runway and taxiways requires grading to fill in numerous holes, depressions, and excessive drop-offs along the edges of the pavement. The surface must be level with the edges of the paved surfaces. Similar erosion problems were also noted during our previous inspection. The Big Bear City airport manager related to the IIC that this discrepancy had been addressed and the issues resolved on July 1, 2002.

Trees penetrate the Runway 26 Federal Aviation Regulations (FAR) Part 77, 20:1 approach surface and must be trimmed or removed. The Big Bear City airport manager related to the IIC that this discrepancy had not been complied with at the time of the accident.

METEOROLOGICAL INFORMATION

At 1000, the Big Bear City Airport (L35) Automatic Weather Observing System (AWOS) reported wind 290 degrees at 7 knots, skies clear, temperature 85 degrees F, dew point 26 degrees F, an altimeter of 30.32 inches of Mercury, and a density altitude of 9,400 feet.

At 1100, the L35 AWOS reported wind 190 degrees at 3 knots, skies clear, temperature 86 degrees F, dew point 27 degrees F, an altimeter of 30.33 inches of Mercury, and a density altitude of 9,500 feet.

At 1120, the L35 AWOS reported wind 040 degrees at 6 knots, skies clear, temperature 88 degrees F, dew point 32 degrees F, and an altimeter setting of 30.33 inches of Mercury, and a density altitude of 9,600 feet.

WRECKAGE AND IMPACT INFORMATION

An FAA inspector, who traveled to the accident site, examined the aircraft and the airport facilities the day of the mishap. On August 21, 2002, an FAA inspector, a Cessna Field Service Engineer, and a Cessna Aircraft Air Safety Investigator examined the wreckage after it had been moved from the accident site.

A visual examination of Runway 26 revealed two distinctive tracks that began at 807 feet and 815 feet from the departure end of the runway. The distance between the marks were representative of the distance between the main landing gear wheels on the subject aircraft; the 807-foot mark corresponded to the left main gear and the 815-foot mark to the right main gear. The marks were light in color. The marks, at times, were intermittent and darker. Continuing off the end of the runway, the marks aligned with ground scars that continued towards Division Road, 106 feet from the end of the runway. The aircraft continued across Division Road and came to rest in a dry lakebed, approximately 400 feet from the departure end of Runway 26.

The fuselage was destroyed from the post-impact fire. The fire mostly consumed the top half of the fuselage structure while melting/disfiguring the remaining sections. Fire damage was heavier on the left side than the right. The tailcone/empennage collapsed as a result of fire damage to the structure. All aircraft components traveled with the aircraft to the final resting location, with the exception of the right main landing gear. The right main landing gear separated at an undocumented distance from the aircraft and did not sustain thermal damage. The tire had no flat spots. The left main landing gear and wheel were extensively damaged by the post-impact fire. The fire partially consumed the tire and brake caliper assembly.

Control cable continuity was not established due to the post-recovery condition of the wreckage. Onsite photographs of the wreckage show each aerodynamic surface in its respective location. The inboard area of each wing sustained substantial thermal damage; the left wing more than the right. The structure of the left wing was consumed outboard to the aileron. The hydraulic actuator indicated the flaps and speed brakes were fully extended. The left horizontal stabilizer was nearly consumed by the post-impact fire.

The cockpit retained its basic shape and volume. Both crew seats were secure in their location; however, neither could be moved and no detailed examination was conducted. The upholstery cover was burned/melted, as were parts of the seat belt webbing. The cabin was mostly consumed by the post-impact fire; the structure from the cabin windows upward and the cabin door aft was consumed. Due to the non-secure position of the cabin, separated from the cockpit and sitting on a trailer, a detailed examination of each seat was not accomplished. The upholstery/interior of the cabin was extensively burned/melted.

After the mishap, the copilot reportedly opened the main cabin door. During the post-recovery examination, it was noted the main cabin door hinge was fractured; however, that section of the fuselage/cockpit was listing to the left, resting on the lower edge of the door.

A cursory examination of both engines was completed. Both engines sustained substantial thermal damage during the post-impact fire. Ingested debris was observed in the first stages of each engine compressor. The left engine sustained more damage than the right engine. The left engine outboard thrust reverser actuator was separated from the engine. The inboard and outboard thrust reverser actuators indicated a stowed position. The right engine thrust reverser outboard actuator and linkages (over-center) indicated a stowed position. Both power levers were in idle cut-off; the thrust reverser levers were observed in the stowed position during the examination.

TEST AND RESEARCH

On October 2, 2002, an examination of the airplane's antiskid brake components was conducted at Crane Hydro-Aire, Burbank, California, by Crane Hydro-Aire engineers under the guidance of an FAA Designated Manufacturing Inspection Representative (DMIR). Testing was performed on the Antiskid Brake Control Unit, Power Brake Valve, and one Wheelspeed Transducer.

All functional test results of the Antiskid Brake Control Unit, S/N 241, were nominal except for one minor discrepancy identified during testing: the PBM (Pressure Bias Modulation) test was out of limits (the PBM decay was 3.1 seconds, and should have been 2.6 +/- 0.2 seconds).

All functional test results of the Power Brake Valve, S/N 213, were nominal except for two minor discrepancies identified during testing: the insulation resistance test was out of limits; it should have been greater than 100 Megohms, but was 31.6 Megohms. In addition, the Pressure-Current plot showed a left shift in the performance curve, which resulted in the unit being out of limits for commanded pressures of less than 500 psi (an engineer reported the actual pressure would be lower than expected pressure during antiskid; however, the pilot would be expected to increase commanded pressure and antiskid control would correct and allow normal pressures). It was unknown whether the crash contributed to the out-of-tolerance conditions noted during the functional test; the servo valve exhibited mechanical damage and it is unknown whether the shock could have produced the out-of-limit condition previously referred to.

Hydraulic fluid samples were taken of the hydraulic fluid in the Power Brake Valve and subjected to particle count analysis. The contamination noted is typical for a valve removed from service. The performance results of the valve functional test do not indicate a contamination problem.

All functional test results of Wheelspeed Transducer, S/N 1512, were nominal except for one minor discrepancy identified; the break-away torque was out of limits.

Wheelspeed Transducer, S/N 1509, was not tested. The physical condition of the component showed evidence of fire, and contact could not be made to the electrical connector, which prevented any functional testing.

It was the conclusion of Hydro-Aire Engineering that the minor discrepancies noted in the functional testing of the components would not have prevented near-normal, high efficiency braking of the airplane if the Power Brake/Antiskid System was energized.

The pilot and copilot's airspeed indicators were removed and retained for testing. On August 29, 2002, two representatives from the Wichita, Kansas, FAA Aircraft Certification Office, accompanied by a representative from Cessna Aircraft, witnessed the testing of both airspeed

indicators at Aero-Mech Labs, Inc., Wichita, Kansas.

The pilot's airspeed indicator, S/N 254ABC, was found to be within specifications, except at one reading on the calibrated side. At 280 knots reference pressure, the unit indicated 284 knots; the tolerance allowed is from 276.5 to 283.5 knots (note: readings from the airspeed indicator were taken visually).

The copilot's airspeed indicator, S/N 285ABC, was found to be within specifications for which it was tested. However, the technicians noted the indicator was a "little sticky" at the low end of the indicated range.

On October 23, 2002, the Hydraulic Power Pack, which produces boosted pressure for the brake system, was operationally tested at Cessna Aircraft Company. Present for the test included one FAA Aircraft Certification Office representative, Cessna Engineering, Manufacturing, and Quality representatives, two representatives from Advanced Industries (firm which built the electric motor part of the power pack), and the Cessna Air Safety Investigator. During the testing sequence, it was observed that the 9912163-1 pressure switch operated intermittently. The consequence of this discrepancy would be the possible illumination failure of the low pressure annunciator during a low pressure condition. With the permission of the NTSB IIC, the switch was replaced and the hydraulic power pack retested. No discrepancies were noted during the retest.

On January 9, 2003, the right brake assembly (P/N 9912246-12) was checked for wear in accordance with an engineering test plan based on the aircraft service manual. The evaluation was conducted at the facilities of Cessna Aircraft Company in the presence of two FAA Aircraft Certification representatives, representatives from Cessna Engineering, Manufacturing, Quality, and Air Safety divisions, as well as two representatives from Aircraft Braking Systems Corporation. Initial examination of the brake assembly revealed the bolts, which hold the disc/rotor stack to the caliper, were loose and two were missing washers. It was unknown when the bolts became loose or were removed. This condition was not observed during the first examination at Callaway Aviation, Big Bear City, California, on August 21, 2002. The brake assembly was removed by Callaway Aviation in the presence of an FAA inspector and shipped to the Wichita FAA Aircraft Certification Office for future evaluation.

After adding washers and retightening the bolts (per specifications), hydraulic pressure was applied to the caliper assembly and the wear measured. The wear measurement, taken between the housing and pressure plate was .541 inches; the dimension should not exceed .610 inches.

On September 6, 2002, two representatives from the Wichita FAA Aircraft Certification Office, a Cessna Engineering representative, and an investigator from Cessna's Product Safety Department, witnessed the testing of the right main landing gear squat switch, the annunciator panel, and the Thrust Reverser/Fire Tray. The squat switch had been removed from the right main landing gear (the left squat switch sustained substantial thermal damage). The squat switch was tested and found to have continuity on all circuits (no discrepancy). When tested, all lights on the annunciator panel illuminated, except for two spares, right hand low fuel light, right hand engine anti-ice, pitot-static heater off, and angle-of-attack heater fail. These lights functioned when the bulbs were changed, confirming the circuit. All lights illuminated on the Thrust Reverser/Fire Tray and both poles of the emergency stow switches had correct continuity.

ADDITIONAL INFORMATION

Aircraft Performance

For preflight planning and dispatch, Federal Aviation Regulations stipulate that Part 135 operators are required to make a full stop landing at the intended destination airport within 60 per cent of the effective length of the runway (FAR 135.385). The following data pertains to Runway 26 at the Big Bear City Airport, Big Bear, California (L35):

Runway length

5,850 feet

Displaced threshold

600 feet

Usable runway length

5,250 feet

5,250' X 60% = 3,150' usable runway for Part 135 operations.

The Cessna Pilot Operating Handbook (POH) for the Model S550, Section IVa, Revision 37 (see Attachment #1), which includes aircraft serial number S550-0031, list the following landing distances for the various conditions at a field elevation of 7,000 feet (6,748 rounded up) at 12,000 pounds landing weight. (According to the manifest, the mishap aircraft landing weight was listed at 12,172.5 pounds.)

Calm winds

With an aircraft weight of 12,000 pounds at a field elevation of 7,000 feet (6,748 feet rounded up) and 30 degrees C (87 degrees F) the aircraft would require 3,350 feet for landing:

(3,350' - 3,150' = 200 feet less than required)

10 knot head wind

With an aircraft weight of 12,000 pounds at a field elevation of 7,000 feet (6,748 feet rounded up) and 30 degrees C (87 degrees F) the aircraft would require 3,090 feet for landing.

(3,150' - 3,090') = 60 feet more than required)

10 knot tail wind

With an aircraft weight of 12,000 pounds at a field elevation of 7,000 feet (6,748 feet rounded up) and 30 degrees C (87 degrees F) the aircraft would require 4,310 feet for landing.

(4,310' - 3,150' = 1,060 feet less than required)

Under the weather conditions (temperature) reported just after the mishap, and using the anticipated landing weight from the load manifest (12,172.5 pounds), the FAA approved Cessna Flight Manual does not provide landing distance information. Had the landing weight and/or temperature been lower, the manual provides landing distance information for those conditions.

A Cockpit Voice Recorder (CVR) was installed in N50BK. A post-accident examination of the CVR by the NTSB laboratory in Washington, D.C., revealed the unit contained no data.

The aircraft wreckage was released to the owner's representative on August 9, 2003.

Pilot Information

Certificate:	Airline Transport	Age:	38, 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:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	04/01/2002
Occupational Pilot:		Last Flight Review or Equivalent:	04/26/2002
Flight Time:	3900 hours (Total, all aircraft), 800 hours (Total, this make and model), 3400 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 50 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Co-Pilot Information

Certificate:	Commercial	Age:	40, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Rear
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	01/28/2002
Occupational Pilot:		Last Flight Review or Equivalent:	10/03/2001
Flight Time:	3800 hours (Total, all aircraft), 3600 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N50BK
Model/Series:	5550	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	S5550-0031
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	07/25/2002, Continuous Airworthiness	Certified Max Gross Wt.:	15100 lbs
Time Since Last Inspection:	8.8 Hours	Engines:	2 Turbo Jet
Airframe Total Time:	5776.2 Hours at time of accident	Engine Manufacturer:	Pratt & Whitney
ELT:	Installed, not activated	Engine Model/Series:	JT15D-4B
Registered Owner:	Melita Eagle Inc.	Rated Power:	2500 lbs
Operator:	Corporate Flight International	Operating Certificate(s) Held:	On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	KBAA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	L35, 6748 ft msl	Distance from Accident Site:	
Observation Time:	1120 PDT	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	40°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.33 inches Hg	Temperature/Dew Point:	31° C / 0° C
Precipitation and Obscuration:			
Departure Point:	Las Vegas, NV (LAS)	Type of Flight Plan Filed:	IFR
Destination:	Big Bear City, CA (L35)	Type of Clearance:	Traffic Advisory
Departure Time:	1038 PDT	Type of Airspace:	Class E

Airport Information

Airport:	Big Bear City Airport (L35)	Runway Surface Type:	Asphalt
Airport Elevation:	6748 ft	Runway Surface Condition:	Dry
Runway Used:	26	IFR Approach:	None
Runway Length/Width:	5850 ft / 75 ft	VFR Approach/Landing:	Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Destroyed
Passenger Injuries:	5 None	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	7 None	Latitude, Longitude:	34.263889, -116.865556

Administrative Information

Investigator In Charge (IIC):	Thomas M Little	Report Date:	03/02/2004
Additional Participating Persons:	Terri Tackett; Federal Aviation Administration; Las Vegas, NV Todd Sigler; Cessna Aircraft Company; Wichita, KS Ned Middleton; Advanced Industries Inc.; 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](#).