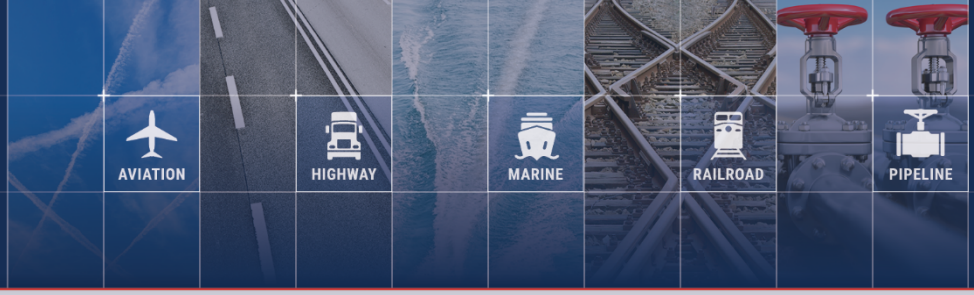

Aviation Investigation Final Report

Location:	Clearwater, Florida	**Accident Number:**	ERA10LA478
Date & Time:	September 12, 2010, 15:30 Local	**Registration:**	N590JL
Aircraft:	Piaggio P-180	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear not configured	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Flight test		

Analysis

The airplane had just undergone several inspections, including one that required operational testing of the landing gear and one, the replacement of an elevator flight control surface, that required a flight check. The pilot-in-command (PIC) later stated that he could not recall observing the position of the landing gear selector during his preflight inspection but reported that he would have checked it. He also reported that part of his preflight inspection included testing the landing gear indicator and warning system using the rotary test switch; no discrepancies were reported.

The flight crew started the engines and taxied the airplane onto the active runway with the flaps set to the mid position. After the takeoff power was applied and set, the cockpit voice recorder (CVR) recorded the second pilot announce rotation at 80 knots. At the moment the CVR recorded the second pilot announce rotation, the CVR recorded a sound consistent with the hydraulic power pack motor operating for 2 seconds, beginning gear retraction. Following the sound of the motor, the CVR recorded a continuous low-pitch tone on the intercom for the next 14 seconds.

The PIC reported that he rotated at 100 knots and, with what he thought were the left and right main landing gears still on the ground, he thought he heard a sound consistent with a blown tire. Recalling that the left elevator had been replaced, he elected to abort the takeoff. He reported that, as he began to retard the throttles and set the nose landing gear onto the runway, he realized that the airplane had descended below the normal wheels-on-ground sight line and that the belly of the aircraft had begun to scrape the runway. The airplane then slid for 1,000 feet before coming to rest upright on the runway with each of the landing gear retracted.

After the accident, an individual who helped recover the airplane reported observing the landing gear selector in the up position. The landing gear was lowered and the airplane was then towed to the ramp. Postaccident testing revealed no preaccident mechanical failures or malfunctions of the landing gear or landing gear position and warning system. The investigation was not able to determine who placed the landing gear selector in the up position.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The flight crew did not ensure that the landing gear was down and that it indicated down through the takeoff sequence.

Findings

Aircraft	Landing gear selector - Incorrect use/operation
Personnel issues	Incorrect action performance - Other

Factual Information

History of Flight

Takeoff	Landing gear not configured (Defining event)
Takeoff	Landing gear collapse

HISTORY OF FLIGHT

On September 12, 2010, about 1530 eastern daylight time, a Piaggio P-180, N590JL, registered to Get Me There LLC, came to rest with the landing gear retracted at the St. Petersburg-Clearwater International Airport (PIE), Clearwater, Florida. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 local maintenance test flight. The airplane sustained substantial damage, and there were no injuries to the certificated airline transport pilot or certificated commercial second pilot. The flight was originating at the time of the accident.

The pilot-in-command (PIC) stated that the purpose of the flight was a maintenance test flight following replacement of the elevator flight control surfaces. He performed a preflight inspection of the airplane which included testing of the landing gear indicator and warning system using the rotary test switch; no discrepancies were reported. He could not recall observing the position of the landing gear selector, but reported he would have checked it as part as his preflight inspection.

The cockpit area microphone (CAM) of the cockpit voice recorder (CVR) recorded one of the crew members advising the brakes were set followed by announcement of the status of lights. The second pilot reported that once the engine start-up procedures were completed he contacted PIE ground control and requested taxi clearance for the intended visual flight rules flight in the traffic pattern. The flight was cleared to taxi to runway 35R, and the second pilot stated that as they taxied, the taxi checks were completed. The captain stated that the flaps were positioned to the “mid” position, and when the flight was cleared for takeoff, “we ran [our] before takeoff checklist as we taxied into position”; however, the CVR did not record any verbal challenge/response to checklist items, nor was one required.

The PIC further reported that he advanced the throttles as the second pilot guarded them and set final takeoff power. The CVR recorded the second pilot to state that he has the power and the airspeed is alive. The PIC reported that he then disengaged the steering, and the second pilot called 80 knots and to rotate. At the time the second pilot called “rotate”, the CAM recorded a sound similar to a mid-frequency motor operating for 2 seconds. Following the sound of the motor, the CVR recorded a continuous low pitch tone on the intercom continuing for the next 14 seconds. At the start of the low pitch sound, the CVR recorded the second pilot to state, “oh #” with the second word an expletive.

The PIC stated that he rotated at 100 knots and with the left and right main landing gears still on the ground, he thought he heard a sound consistent with a blown tire. At that time, he recalled how the left elevator was replaced during his assessment to continue or abort, and elected to abort the takeoff. He reported that as he began to retard the throttles and set the nose landing gear onto the runway, he, "…noticed the aircraft started to feel a little strange it was about this time is when I realized I was descended below my normal wheels on ground sight line and the belly of the aircraft began to scrape the runway." At that time the CVR recorded the PIC to state that the landing gears had collapsed and informs the second pilot they will secure the airplane. The airplane slid for about 1,000 feet and smoke began filling the cockpit. He advised the second pilot to get out of the airplane and both evacuated it. He later reported looking into the cockpit and saw the wheel shape of the landing gear selector was sideways but could not tell whether the selector was in the up or down position. He also reported that after exiting the airplane he did not re-enter the cockpit or move any switches.

Neither flightcrew member reported any abnormal aural sounds/annunciations from the point of their preflight inspection to the point where the captain reported hearing the sound he associated with a burst/blown tire.

PERSONNEL INFORMATION

While the airplane is certificated for a single pilot, two flightcrew members were on-board.

The PIC, age 44, seated in the left seat, is a contract pilot for the family owned airplane. He holds airline transport pilot and commercial pilot certificates. On the airline transport pilot certificate he has airplane multi-engine land rating, and on the commercial certificate he has airplane single engine land rating. He was issued a first class medical certificate with a limitation to wear corrective lenses on November 24, 2009. On the NTSB Pilot/Operator Aircraft Accident/Incident report form, he indicated having a total time of approximately 9,410 hours, and 186 hours in the accident make and model airplane, all of which were reported to be as PIC. His last flight review in accordance with 14 CFR Part 61.56 was performed in a Piaggio P-180 airplane on November 19, 2009.

The second pilot, age 28, seated in the right seat, is also a contract pilot for the family owned airplane. He holds commercial and certified flight instructor (CFI) pilot certificates. On the commercial certificate he has airplane single and multi-engine land, and instrument airplane ratings, and on the CFI certificate he has airplane single engine rating. He was issued a second class medical certificate with no limitations on January 21, 2010. On the NTSB Pilot/Operator Aircraft Accident/Incident report form, he indicated having a total time of approximately 1,046 hours, and 173 hours in the accident make and model airplane. Of the 173 hours, 43 hours were reported to be as PIC. His last flight review in accordance with 14 CFR Part 61.56 was performed in a Cessna 172 airplane on November 8, 2009.

AIRCRAFT INFORMATION

The airplane was manufactured in 1992 by Industrie Aeronautiche e Meccaniche as model P-180, and designated serial number 1014. It was powered by two 850 shaft horsepower Pratt & Whitney PT6A-66 engines and equipped with two Hartzell HC-E5N five bladed propellers.

The airplane is equipped with hydraulically actuated, fully retractable tricycle landing gear. Hydraulic pressure to retract and extend the landing gear normally is supplied by an electrically activated power package powered by an electric motor.

The double-wheel nose gear retracts forward into the nose section and the main gear retracts rearward into the fuselage; doors completely cover the retracted landing gears. The rear door of the nose gear well and the forward doors of the main gear strut wells are mechanically operated by the gear through connecting linkages and remain open when the gear is extended. The wheel well doors of the nose gear (side hinged doors) and of the main gear (aft doors), that are mechanically operated, open during gear extension and close when the gears are fully extended.

To guard against the retraction of the landing gear when the airplane is on the ground or when the nose wheel is not centered, two micro switches (one on the nose gear and one on the right main gear shock absorber) are provided which when made inhibit the hydraulic power package from supplying pressure fluid to the "up section" of the gear actuators. All landing gear actuators are fully extended when the landing gear is down and retracted when the landing gear is up. Each actuating cylinder is provided with internal up and down locks; each lock directly actuates the switches controlling the landing gear position indicating lights. The locks are normally closed type and can be opened only by applying positive pressure. An internal shuttle valve in each actuating cylinder allows operating the landing gear extension either on the main or on the emergency hydraulic lines.

The landing gear controls and indicators are located on the LANDING GEAR panel in the center of the instrument subpanel. The two position (UP and DN) landing gear control lever is just to the right of the indicator lights assemblies: three UNSAFE red warning lights (NOSE, LH and RH), three LOCKED DN green advisory lights (NOSE, LH and RH). Each red word readout type light indicates that the corresponding gear is in motion between the "up locked" and the "down locked" position. Each green word readout type light indicates that the corresponding gear is down and locked. When the gear is up and locked, there is no light illuminated. A red LH or RH light illuminated after gear extension or retraction may indicate that the corresponding side main gear rear door is not positively closed and locked. In this event the positive lock of the landing gear leg can be checked through the hydraulic pressure indication.

The correct operation of the landing gear indicating system can be checked selecting on the SYS TEST panel the LND GR position and pressing the central button: the UNSAFE red and the LOCKED DN green lights should illuminate while the GEAR WARNING tone should be generated.

Review of the maintenance records revealed the airplane was last inspected in accordance with a 1 month, 3 month, 6 month, 1 year and 2 year inspections. The maintenance record entry indicates the maintenance was performed in accordance with the airframe, engine, and propeller maintenance and component manuals; the entry was signed off as being completed on September 12, 2010. The airplane total time at the time of the inspection was recorded to be approximately 4,642 hours and 3,891 airframe landings. Additionally, the left elevator was removed and replaced. The maintenance record entry for the inspections is included in the NTSB public docket for this case.

METEOROLOGICAL INFORMATION

A special surface observation weather report taken at PIE, at 1544, or approximately 14 minutes after the accident indicates the wind was from 300 degrees at 8 knots, the visibility was 10 statute miles, and few clouds existed at 3,300 feet. The temperature and dew point were 32 and 24 degrees Celsius respectively, and the altimeter setting was 29.92 inches of Mercury.

FLIGHT RECORDERS

The airplane was equipped with a L-3 Communications CVR, model FA 2100-1010, serial number 000349177, which records and retains only the most recent 30 minutes of CVR operation. The four channels of audio are stored in solid-state memory modules. Of the four channels of audio information, one is for each flight crew member, and one channel is for the CAM; the fourth channel is not used.

Inspection of the CVR revealed no damage, and the audio information was extracted from the recorder normally without difficulty. The recordings from each flight crew member audio panels were excellent quality, while the audio channel from the CAM was good quality.

A group was not convened to read-out the CVR; only a summary transcript was prepared which indicated pre accident audio, the accident sequence, and post accident audio were recorded. The CVR summary transcript is contained in the NTSB public docket for this case.

AIRCRAFT EXAMINATION

According to an individual who helped recover the airplane from the runway, when first viewed the landing gear selector was in the “up” position. Additionally, all landing gears were in their respective wheel wells, and the landing gear doors were closed. The airplane was raised from the runway and without movement of the landing gear selector switch, the landing gear was lowered using the manual system. The battery was disconnected and the airplane was towed inside a hangar and secured.

The following day, two Federal Aviation Administration (FAA) inspectors witnessed gear extension and retraction tests while the airplane was raised on jacks. The landing gear was

cycled several times using the normal system with no discrepancies noted. Inspection of the main landing gear tires revealed the right tire exhibited a flat spot on the inboard sidewall and was devoid of pressure, while the left tire also exhibited a flat spot on the inboard sidewall but still retained pressure.

Follow-up examination and testing of the landing gear system was performed by representatives of the airplane manufacturer with FAA oversight. The follow-up testing and examination was performed in an attempt to determine whether any mechanical failure or malfunction of the normal hydraulic or indication systems could have caused uncommanded retraction of the landing gears. The testing revealed no preimpact mechanical failures or malfunction, of the hydraulic system, weight-on-wheels (WOW) micro switches, electrical or annunciation systems. Additionally, the landing gear control handle locking mechanism integrity test was also performed; no defects were noted. By design, the landing gear control handle requires two actions to change position; pull out and place in the up position, or pull out and place in the down position. A statement from the FAA inspector who witnessed the testing is contained in the NTSB public docket for this case.

TEST AND RESEARCH

The airplane was not equipped, nor does 14 CFR Part 23.729 titled, “Landing gear extension and retraction system” require, an annunciator to illuminate with a disagreement between the position of the landing gear selector handle and the actual position of the landing gears.

Review of the 1 month, 3 month, 6 month, 1 year and 2 year inspection check lists that were signed off as being completed on the day of the accident revealed the 1 year inspection called for an operational test of the landing gear. No other maintenance to the landing gear system was recorded as being accomplished. The inspections and work order associated with the inspections are included separately in the NTSB public docket for this case.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	44,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	November 24, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 19, 2009
Flight Time:	9410 hours (Total, all aircraft), 186 hours (Total, this make and model), 8076 hours (Pilot In Command, all aircraft), 98 hours (Last 90 days, all aircraft), 29 hours (Last 30 days, all aircraft)		

Co-pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	28,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 21, 2010
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 8, 2009
Flight Time:	1046 hours (Total, all aircraft), 173 hours (Total, this make and model), 844 hours (Pilot In Command, all aircraft), 75 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piaggio	**Registration:**	N590JL
Model/Series:	P-180	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1014
Landing Gear Type:	Retractable - Tricycle	**Seats:**	10
Date/Type of Last Inspection:	September 12, 2010 Continuous airworthiness	**Certified Max Gross Wt.:**	10810 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo prop
Airframe Total Time:	4642 Hrs at time of accident	**Engine Manufacturer:**	Pratt & Whitney
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-66
Registered Owner:	Get Me There LLC	**Rated Power:**	850 Horsepower
Operator:	Get Me There LLC	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	PIE,11 ft msl	**Distance from Accident Site:**	
Observation Time:	15:44 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 3300 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	8 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.92 inches Hg	**Temperature/Dew Point:**	32°C / 24°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Clearwater, FL (PIE)	**Type of Flight Plan Filed:**	None
Destination:	Clearwater, FL (PIE)	**Type of Clearance:**	None
Departure Time:	15:30 Local	**Type of Airspace:**	

Airport Information

Airport:	St. Petersburg-Clearwater Int. PIE	**Runway Surface Type:**	
Airport Elevation:	11 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	35R	**IFR Approach:**	None
Runway Length/Width:	9730 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	27.909999,-82.687225(est)

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	David King; FAA/FSDO; Orlando, FL Robert E Haynes; FAA/FSDO; Orlando, FL Paolo E Pellegrini; Piaggio Aero Industries SpA
Original Publish Date:	February 23, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=77277