



Accident to the PIPER - PA28 RT - 201T, Turbo Arrow IV registered F-GMSE

on 28 June 2019
at Île d'Yeu (Vendée)

⁽¹⁾ Unless otherwise stated, all times given in this report are in local time.

Time	14:20 ⁽¹⁾
Operator	Club de Dunkerque Les Moeres
Type of flight	Cross-country
Persons on board	Pilot, instructor and two passengers
Consequences and damage	Aircraft severely damaged
This is a courtesy translation by the BEA of the Final Report on the Safety Investigation published in April 2020. As accurate as the translation may be, the original text in French is the work of reference.	

Retraction of landing gear during take-off, in training flight

1 - HISTORY OF THE FLIGHT

Note: The following information is mainly based on the statements and radiocommunication recordings.

Four people, including three pilots who held the class rating and were members of the club, set off together, as they do every year, for pleasure flights from Dunkerque Les Moeres aerodrome (Nord). The pilot in the right-hand seat was also an instructor and advised the other pilots when he detected significant in-flight deviations.

On Thursday 27 June, they took off from Morlaix Ploujean aerodrome (Finistère) to fly to Quiberon aerodrome (Morbihan), before heading towards Île d'Yeu, under VFR. At the end of the right-hand downwind leg for runway 14 of Île d'Yeu aerodrome, and after the pilot had set the landing gear extension selector switch to the DOWN position, the green light associated with the nose gear was still off and the red "Warning gear unsafe" light came on. The associated aural warning was not activated⁽²⁾. After checking the operation of the light bulb of the green light and an unsuccessful landing gear retraction/extension test, the instructor informed the AFIS officer of the problem and asked him to confirm the landing gear position as he passed in front of the control tower. The AFIS officer confirmed that he could see all three landing gear extended, and the instructor decided to return to the downwind leg and extend the landing gear in emergency mode. The pilot, who was in the left-hand seat, went around, then retracted the flaps and the landing gear. He then managed the approach while the instructor performed the actions of the landing gear emergency extension procedure from memory. The three green landing gear down lights lit up. The red "Warning gear unsafe" light remained off. The pilot landed on runway 14 without any particular problem.

⁽²⁾ The cause of this malfunction was not identified during the safety investigation.

⁽³⁾ The pilot in the left-hand seat was not the same person as the previous day.

The next day⁽³⁾, at about 14:20, while taxiing towards the threshold of runway 32 for a flight to Saint-Nazaire Montoir aerodrome (Loire-Atlantique) under VFR, the red “*Warning gear unsafe*” light switched on and off intermittently along with the associated aural warning. During the take-off run on runway 32, the instructor pulled on the control column at the same time as the pilot when he noticed the nose of the aircraft drop. He released the control column to prevent the aircraft from stalling. The aircraft left the ground for a few seconds and then slid down the runway with the landing gear retracted. The aircraft came to rest on the runway about 560 m from the threshold of runway 32.

2 - ADDITIONAL INFORMATION

2.1 Aircraft information

2.1.1 Landing gear

The landing gear system is hydraulically operated by an electric pump, which is controlled via a landing gear selector switch on the instrument panel. Three green lights (one for each landing gear) are lit when the limit switches on each landing gear close⁽⁴⁾ and confirm that the landing gear is extended and locked. The landing gear retracts when the landing gear selector switch is moved to the UP position and the landing gear struts are no longer compressed by the weight of the aircraft.

A microswitch controlled by the power lever activates an aural warning and lights up the red “*Warning gear unsafe*” light under the following conditions:

- landing gear retracted (or not fully extended and locked) and inlet pressure less than approximately 14 in Hg; or
- landing gear selector switch in UP position and aircraft on the ground with the engine running and the power lever at idle.

In 1987, the aircraft manufacturer issued a service bulletin (SB866) requiring the removal of a system equipping the aircraft that:

- automatically extended the landing gear when the landing gear selector switch was in the UP position, the indicated airspeed was less than 103 kt and the inlet pressure was less than approximately 14 in Hg;
- prevented retraction of the landing gear at airspeeds below 78 kt with full engine power when the landing gear selector switch was in the UP position.

In 1988, an update to the service bulletin (SB866A) allowed owners to retain this system under certain operational conditions. This system was no longer installed on aircraft manufactured after the release of this update of SB866. This system was removed from F-GMSE⁽⁵⁾ and a metal tag was attached under the landing gear selector switch to recall this.

At the end of the flight on Thursday 27 June, in order to obtain an opinion on the failure encountered, the instructor sent several photographs of the nose gear to the person in charge of the aircraft maintenance workshop. A failure of the nose gear limit switch was considered as a possible explanation as to why the associated green light did not light up when the aircraft was in the aerodrome circuit with its nose gear extended and, in all probability, locked. As there was no maintenance organization at Île d’Yeu aerodrome, the instructor decided to continue the flights with this failure and with the landing gear extended during the flights.

⁽⁴⁾ Located on the locking system.

⁽⁵⁾ Year of construction: 1981.

2.1.2 Standard procedures and checklist

The “cockpit preparation” and “pre-take off” procedures and checklist in the pilot operating handbook (POH) do not refer to the landing gear selector switch. There is no provision for checking the circuit breakers (located on the right side of the instrument panel in front of the pilot seated in the right-hand seat) before a flight. The “Approach and Landing” procedure indicates “Gear...Down 133 kt”. There is no specific requirement to check the landing gear selector switch.

For PA28RT-201T type aircraft manufactured after the publication of SB866A, the POH specifies that the pilot should check that the landing gear selector switch is in the DOWN position during the pre-flight inspection. The “Before Engine Start-up” checklist requires, among other things, that all the circuit breakers are engaged. For these aircraft, provision is made to check the position of the landing gear selector switch in the “Approach and Landing” checklist.

The checklists on board the aircraft and developed by the club include a check of the circuit breakers when preparing the cockpit. The “Before landing” checklist reads “Gear... down 3 greens”. There is no specific requirement to check the landing gear selector switch.

2.1.3 Landing gear emergency extension procedure

The landing gear emergency extension procedure allows the landing gear to be extended by gravity and, according to the POH, requires the following actions:

- check that the battery is ON;
- check that the circuit breakers are engaged;
- in daylight, turn off the navigation and instrument panel lights;
- test the operation of the three green landing gear lights;
- reduce the indicated airspeed to below 88 kt;
- move the landing gear selector switch to the DOWN position;
- hold down the red EMERGENCY DOWN lever⁽⁶⁾ until all three green lights are on.

In the event of a fault with the landing gear extension, the club uses an initial procedure, known as the “Landing gear extension fault” procedure, which uses the first four actions of the above procedure, and a second procedure, known as the “Landing gear emergency extension” procedure, which requires, in addition to performing identical actions on the landing gear selector switch and the lever, that the pilot extends the flaps to the 1st detent position and reduces the speed to 85 kt instead of 88 kt. These procedures were available onboard the aircraft.

2.2 Pilot in left seat information

The pilot, who held a PPL(A) licence, had logged approximately 300 flight hours.

⁽⁶⁾ Action enabling the landing gear to be extended by gravity.

2.3 Instructor information

The instructor held a PPL(A) licence, an IR(A) instrument rating, an FI(A) flight instructor rating, a CRI(A) class rating instructor and an IRI(A) instrument rating instructor. He had logged around 9,150 flight hours, including 89 hours in the last six months and 32 hours on aircraft of the same class (Piper PA28 200RT and Socata TB20). He had also logged more than 3,000 flight hours as an instructor on the Socata TB20, including a significant number of landing gear extension failure simulations.

He indicated that, after noticing that the green nose gear light was not lit, he instinctively reverted to his role as an instructor, dividing up the tasks as follows with the agreement of the pilot in the left seat:

- flight path control by the pilot in the left seat;
- management of the failure and communications by the pilot in the right seat.

He added that he performed the landing gear emergency extension procedure actions from memory during the downwind leg after the go-around. He explained that he most probably tripped the circuit breaker first. He interrupted his actions to instruct the pilot in the left seat to climb back up to the aerodrome circuit altitude. He was of the opinion that this interruption probably led him to subsequently activate the red EMERGENCY DOWN lever without first placing the landing gear selector switch in the DOWN position. He explained that he applied the landing gear emergency extension actions as a matter of routine and, as such, tripped the landing gear circuit breaker as per the procedure for the Socata TB20 aircraft.

After the accident, he realised that the landing gear selector switch was in the UP (retracted) position and that the landing gear circuit breaker was engaged. He did not know when this circuit breaker was re-engaged after the flight on Thursday 27 June.

The instructor had flown several flights in the days preceding the departure from Dunkerque les Moeres aerodrome and had simulated several landing gear failures by tripping the corresponding circuit breaker and re-engaging it after the failure had been managed.

2.4 Information regarding the Socata TB20

According to the aircraft flight manual, the landing gear extension failure procedure (one or more green lights are not lit) first requires actions similar to those in the "*Gear Extension Fault*" procedure applied by the Dunkerque Les Moeres club for F-GMSE. The procedure then requires the following actions if the landing gear is not extended and locked:

- move the landing gear lever to the UP position;
- trip the landing gear circuit breaker;
- move the landing gear lever to the DOWN position;
- pull the emergency landing gear control;
- check that the green "*landing gear down*" lights are on and the "*landing gear manoeuvring*" (red) light is off.

2.5 Meteorological conditions

At the time of the accident, the wind was 310°, at 7 to 10 kt, visibility was greater than 10 km, and the height of the cloud ceiling estimated by the AFIS agent was 500 ft. At Saint-Nazaire Montoir aerodrome, the meteorological conditions were CAVOK. The instructor indicated that he spoke before the accident flight with a pilot who had just landed; the pilot confirmed to him that the thickness of the cloud layer was 400 ft and that there was a break in the clouds to the south-east of the aerodrome.

3 - CONCLUSION

The conclusions are established solely on the basis of the information that came to the knowledge of the BEA during the investigation. They are in no way intended to apportion blame or liability.

Scenario

The day before the accident, the instructor carried out a landing gear emergency extension due to a partial visual indication of the landing gear being down (nose gear light off). The landing gear emergency extension actions were performed from memory based on a procedure from an aircraft he was used to flying. These actions were also interrupted. The landing was probably completed with the landing gear selector switch in the UP position and with the landing gear circuit breaker tripped.

On the day of the accident, the take-off was conducted with the landing gear selector switch in the UP position and the landing gear circuit breaker engaged. The landing gear retracted as soon as the landing gear struts were no longer compressed by the weight of the aircraft.

Contributing factors

The following factors may have contributed to the retraction of the landing gear during take-off:

- The failure to use the documentation available onboard the aircraft to apply the landing gear extension fault procedure, which is not subject to any particular time pressure.
- The management of the landing gear emergency extension procedure was interrupted, which led to the omission of one of the actions and leaving the landing gear selector switch in the UP position.
- Prior to landing on the flight preceding the accident flight, confirmation of the landing gear extension and locking was based solely on the three green lights being lit, as generally required by the procedures and checklists, without checking the position of the landing gear selector switch.
- The absence in the aircraft's procedures of any check of the position of the landing gear selector switch during pre-flight cockpit preparation.

- ❑ During taxiing on the day of the accident, a misrepresentation of the situation led the persons onboard to associate the aural and visual warnings activated intermittently during taxiing with a malfunction of the nose gear switch rather than with the landing gear selector switch being in the UP position while the aircraft was on the ground.
- ❑ Focusing on other aspects, such as the meteorological conditions.
- ❑ The aircraft manufacturer's failure to update the procedures in the POH after the publication of the service bulletin regarding the removal of the system allowing for the automatic extension of the landing gear and preventing its retraction under certain conditions.