



MINISTRY OF CONSTRUCTION AND TRANSPORT

TRANSPORTATION SAFETY BUREAU

FINAL REPORT

(English Language Summary)

Piper Seneca I. PA-34-200, HA-SOA

Atkár-Gyöngyöshalász Airfield, 7 November 2020

Accident

2020-0523-4

**This is an English language abstract of the official safety report written in Hungarian.
Final Reports are published at www.kbsz.hu.**

The sole objective of a safety investigation is to find the causes and circumstances of aviation accidents or incidents and to initiate the necessary safety measures; furthermore, to make recommendations in order to prevent similar cases in the future. It is not the objective of an investigation to apportion blame or liability.

Introduction

Synopsis

Occurrence class	Accident	
Aircraft	Manufacturer	Piper Aircraft Corporation, USA
	Model	PA-34-200
	Registration	HA-SOA
	Operator	CAVOK Aviation Training Kft.
Occurrence	Date and Time	7 November 2020, 13:35 LT
	Location	Atkár-Gyöngyöshalász Airfield N47°42'58.98", E019°54'58.86"
Fatalities / Severe Injuries	0 / 0	
Damage to Aircraft	Substantial	

On November 7, 2020, at 13:35 local time, the crew of a Piper Seneca I (PA-34-200) aircraft, during instruction and on short final for RWY 02 of Atkár-Gyöngyöshalász Airfield, attempted a single engine go-around from a practice engine failure. The aircraft veered left and lost altitude, the left wingtip struck the ground in the plow field left of the runway. The aircraft crashed and came to a stop in the soft wet soil, spinning about 150 degrees to the left, sustaining substantial damage. The crew of two managed to escape without injuries.

The investigation has revealed that the accident occurred due to a decrease of airspeed below $V_{mc(a)}$ with the simultaneous increase of power on single engine during go-around, resulting in a loss of control in flight. Contributing factors include human errors such as planning and flight briefing deficiencies, deviations from relevant rules and regulations, as well as loss of situational awareness and pilot errors during the attempted maneuver. In addition, the missing ASI from the instructor's panel may also have contributed to the accident.

During the time of investigation, the training organization implemented risk-mitigating measures detailed in this report. The Investigation Committee of the Hungarian Transport Safety Bureau (hereinafter: IC) will not issue a safety recommendation.



Figure 1.

General information

All times indicated in this report are in local time (LT). LT at the time of the occurrence: UTC+1 hour.

Geographic locations throughout this document are provided by WGS-84 standard.

The format and content of this report is in harmony with Chapter 6 of Annex 13 of Act XLVI of 2007 promulgating the Appendices to the Convention on International Civil Aviation, signed in Chicago on 7 December 1944. Appendix, as well as with the requirements set out in ICAO Doc 9756 Part IV.

Reports and Notifications

The occurrence was reported to TSB's call center at 13:54 on 7 November 2020, by the Operator's representative.

In line with Article 9, Section (2) of Regulation (EU) No 996/2010 of the European Parliament and of the Council, TSB of Hungary notified the following organizations.

- Accident Investigation Authority of the State of Design and Manufacture (USA) at 13:30 on 7 November 2020.
- EASA at 13:30 on 7 November 2020.

Investigation Committee

The Head of TSB appointed the following persons in the investigating committee (hereinafter: IC).

Investigator-in-Charge	Mr. Gabor Erdosi
Member	Mr. Akos Hanczar

Overview of the Investigation Process

Receiving event notification, the on-duty TSB supervisor mandated an immediate dispatch to the site.

Pursuant to Article 5 of REGULATION (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/ECA the TSB is required to initiate an investigation in the following circumstances.

1. *Every accident or serious incident involving aircraft to which Regulation (EU) 2018/1139 of the European Parliament and of the Council applies shall be the subject of a safety investigation in the Member State in which the accident or serious incident occurred.*
2. *Where an aircraft to which Regulation (EU) 2018/1139 applies and which is registered in a Member State is involved in an accident or a serious incident the location of which cannot be definitely established as being in the territory of any State, a safety investigation shall be conducted by the safety investigation authority of the Member State of registration.*
3. *The extent of safety investigations referred to in paragraphs 1, 2 and 4 and the procedure to be followed in conducting such safety investigations shall be determined by the safety investigation authority, taking into account the consequences of the accident or serious incident and the lessons it expects to draw from such investigations for the improvement of aviation safety.*
4. *Safety investigation authorities may decide to investigate incidents other than those referred to in paragraphs 1 and 2, as well as accidents or serious incidents to other types of aircraft, in accordance with the national legislation of the Member States, when they expect to draw safety lessons from them.*
5. *By way of derogation from paragraphs 1 and 2 of this Article, the responsible safety investigation authority may decide, taking into account the expected lessons to be drawn for the improvement of aviation safety, not to initiate a safety investigation when an accident or serious*

incident concerns an unmanned aircraft for which a certificate or declaration is not required pursuant to Article 56(1) and (5) of Regulation (EU) 2018/1139, or concerns a manned aircraft with a maximum take-off mass less than or equal to 2 250 kg, and where no person has been fatally or seriously injured.

Based on the findings of the site inspection and with regard to Article 5 (1) of Regulation (EU) No 996/2010 of the European Parliament and of the Council, the head of the TSB decided that an investigation is required and will be launched.

In the course of the investigation the IC has taken the following actions:

- examined the crash site and the wreck and secured evidence available
- interviewed the crew
- obtained flight tracking and radio communication data from the relevant ATS units
- obtained registration and aircraft maintenance documentation, as well as training logs and manuals from the flight school
- carried out a follow-up inspection of the wreck to examine aircraft instrumentation
- interviewed the crew once more to get further details of the entirety of the flight
- examined and analyzed CAA documentation regarding aircraft registration and airworthiness revisions
- obtained ATO manuals and modifications
- obtained documentation concerning retrofits and modifications affecting cockpit instrumentation
- analyzed all facts and documents available

Investigation Principles

This investigation is being carried out by Transportation Safety Bureau on the basis of the following disciplines.

- Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC,
- Act XCVII of 1995 on aviation,
- Annex 13 identified in the Appendix of Act XLVI. of 2007 on the declaration of the annexes to the Convention on International Civil Aviation signed in Chicago on 7th December 1944,
- Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents (referred to as Kbvt. throughout the document),
- NFM (Ministry for National Development) Regulation 70/2015 (XII.1) on safety investigation of aviation accidents and incidents, as well as on detailed investigation for operators,
- In matters not covered by Kbvt., Act CL of 2016 on General Public Administration Procedures prevails.

The competence of the Transportation Safety Bureau of Hungary is based on Government Regulation № 230/2016. (VII.29.) on the assignment of a transportation safety body and on the dissolution of Transportation Safety Bureau with legal succession.

Pursuant to the aforesaid legislation,

- Transportation Safety Bureau of Hungary shall investigate aviation accidents and serious incidents.
- Transportation Safety Bureau of Hungary may investigate aviation and incidents which – in its judgment – could have led to accidents of more severe consequences in different circumstances.
- Transportation Safety Bureau of Hungary is independent of any person or entity that may have interests in conflict with the objectives of the investigating body.
- In addition to the aforementioned legislation, TSB of Hungary shall conduct safety investigations in line with ICAO Docs 9756 and 6920 Manual of Aircraft Accident Investigation.

- This Report shall not be binding, nor shall an appeal be lodged against it.
- The original of this report was written in Hungarian.

No conflict of interest has been identified between safety investigators appointed to the IC. Investigators assigned to a safety investigation shall not be involved as experts in any other procedure pertaining to the same case and shall refrain from doing so in the future.

The IC shall retain all data and information having come to their knowledge in the course of the safety investigation. Furthermore, the IC shall not be obliged to make such data and information available to other authorities, if their original owner could have legally refused disclosure.

This Final Report is based on the Draft Report prepared by the IC that was sent to all involved parties for comments, as set forth by the relevant regulations.

Until the legal deadline for comments and revisions, no alternative or contradictory opinions and no expression of dissent have been received from the parties involved.

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With the exceptions stipulated by law, this report or any part thereof may be used in any form, provided that context is maintained and clear references are made to the cited source.

Translation

This summary is based on the full report written in Hungarian. Although efforts have been made to provide a translation as accurate as possible, discrepancies between the versions might occur. In such eventuality, the Hungarian version shall prevail.

Factual information

Flight History

The crew took off from Gödöllő airport around midday on full fuel load to begin the trainee's twin-engine class rating training. The declared purpose of the flight was practicing basic aircraft handling maneuvers. The instructor did not inform the trainee, until after takeoff, that the day's drills would also comprise touch-and-go's at Atkár airfield, which the instructor deemed more suitable for this purpose than Gödöllő airfield. Based on HungaroControl radar and radio communication data, the total duration of the flight to their destination was about an hour.

Upon arrival at Atkár, the crew flew four standard, twin-engine circuit patterns. Subsequently, on short final to RWY 02, the instructor chopped the left engine's throttle and instructed the trainee to continue the approach on single-engine to land. The trainee, as recounted by the instructor, made the right initial flight path adjustments. As it was revealed later on, neither of the crew remembered to increase power on the remaining engine to sustain approach path and flight parameters. Unnoticed by the crew, the airspeed started to wear off and the trainee struggled to maintain a steady VS commensurate with the glide path.

Realizing he was unable to complete the approach, the trainee initiated a go-around and applied full right throttle as per the instructor's single-engine instructions. At this point the left wing dropped abruptly and the aircraft, banking left, hit the ground left of the runway, left wingtip first, and slid about 60 meters on the soft soil while spinning left about 150 degrees, coming to a halt on its belly with the nose gear torn off and the main gears collapsed. After a quick shut-down procedure (although the battery ripped out of the nose when the nose cone shattered on impact), both occupants managed to leave the cockpit without injuries.

Analysis

The involved aircraft's instrument panel had been enhanced with a Garmin G5 multifunction electronic instrument system unit installed on the left side. This unit is also capable of recording a number of flight parameters on an SD card, when provided. However, no data card had been used in this aircraft, so the IC's conclusions are based on facts and findings of the investigation.

Pilot interviews and facts of the investigation indicate that the direct cause of the accident was the decrease of airspeed below $V_{mc(a)}$. Below this critical speed, with full throttle applied on the operating engine and full opposite rudder input, the deviation to the left and subsequent rolling to the left could not be prevented.

Both the aircraft's POH and the cockpit placards present 80 mph as $V_{mc(a)}$. This value is indicated as a red line on the airspeed indicator (Figure 5). The flight school's training manuals, however, are not entirely in line with Piper's recommendation, which advises against intentionally flying single engine maneuvers below V_{sse} (90 mph). In the ATO's cockpit SE checklist that the pilots used, $V_{mc(a)}$ is cited as minimum single engine reference airspeed, which no longer includes the 10 mph safety margin as suggested by Piper.

In situations where this safety buffer is knowingly abandoned, it becomes crucial for the instructor to meticulously safeguard SE airspeed and make sure it never drops below $V_{mc(a)}$, because flying at this speed in ground proximity leaves no margin for error – particularly during approach, where go-around may be necessary.

In this particular aircraft the instructor's options were largely reduced in this respect on account of the missing airspeed indicator on the right side, which had been removed without available documentation before the A/C was registered in Hungary. To check the airspeed at any moment, the instructor therefore needed to glance over to the other side. To make things worse, his direct line of vision to the

left side ASI was partially blocked by the very G5 unit, which had been installed 17 mm proud of the instrument panel, rather than flush with it. Furthermore, the ASI's instrument light cover had come loose sometime in the past, further restricting direct view from the right side at the ASI, especially in case of a forward right seat position. These factors collectively pose an increased safety hazard.

Figure 6 shows that the entire right side of the ASI's speed scale that includes the Vmc(a) red line is the affected part, not visible from the right. The outside arc of the scale on this side of the ASI is visually blocked by the G5 unit for the right seat occupant, irrespective of their seat position being fully aft or fully forward. Tests conducted in the cockpit revealed that figures on the inside scale can only be seen from the right seat when the seat is set fully aft. Even then, the red line remains out of sight for someone of average build in the right seat. Any person smaller than average trying to check the airspeed will not be able to see past the G5 unit and the entire right side of the speed scale – including both the outside and inside arc – will be visually blocked out for them.

The IC also believes that reading the left-side airspeed indicator from the right seat in any seat setting will be further impaired by parallax and interpolation errors during flight, which, along with vibrations, will make accurate or reliable reading impossible.

In twin-engine training, especially during SE drills, it's critical for the instructor to have a clear view at the airspeed at all times. The most obvious way to secure the instructor's unobstructed sight at the speed scale would be to retain the original ASI installed on the right side panel, just as Piper had designed and configured the AC on first delivery. The need to constantly glance to the other side for airspeed reading is not ideal, as it can cause both response delays and distractions from other duties for the instructor. The only airspeed information that was available for the instructor without visual obstruction was that of the G5 digital display on the other side, which, as per regulations, is to be considered a secondary instrument.

Several requirements listed in the ATO's Training Manual, as referred to in section 1.17 of this report, were not observed during the flight presently investigated, according to the following.

Preparation. To achieve a high degree of efficiency in flight training, trainees need to be prepared both in terms of knowledge and understanding of the goals and catches of each drill they are to fly. They need to have a clear picture of a planned exercise, comprehend its context and prepare for anticipated challenges ahead of time, with the instructor's help and guidance. At early stages of a training – in this case, in the second flight –, it is not ideal to include unexpected drills for the trainee if those exercises have not been discussed before. As it happened during the flight investigated, the idea of practicing single-engine go-arounds only came up after takeoff, suggested by the instructor. According to the referenced training curriculum, this exercise should be preceded by a demonstration where the instructor demonstrates the drills and highlights their complexities and pitfalls. After this hands-on demonstration, the trainee should progressively practice SE maneuvers in increasingly steeper turns, gradually mastering the elements until they are confident in flying SE traffic patterns, then SE landings. Go-arounds can only follow subsequently. The steps of this gradual progression have all been omitted in this training, in contradiction to the principle of 'simple-to-complex' progression set forth in the referenced Training Manual.

Altitude restrictions. The TM also stipulates that SE go-around drills can only be practiced at altitudes of 2,000 feet AGL or higher, which was not observed in this flight, where the crew went on to attempt their very first SE go-around in real conditions, with the trainee at the controls and the instructor supervising.

Following a learning curve and maintaining SA. Making these shortcuts in the curriculum likely imposed too fast a pace on the trainee without allowing him adequate means to understand the risks and to be able to handle its challenges effectively. Crash could still be avoided with the instructor's unflawed situational awareness and close airspeed monitoring, which could have been a great deal more efficient with an ASI installed in front of him, with adequate Vmc(a) markings.

Observing basic airmanship rules. Not increasing thrust on the remaining engine to maintain airspeed when the instructor cut the power on the other is a cognitive error that neither pilots trapped in time. When the trainee corrected control deflections to maintain the approach trajectory, neither pilot

seemed to remember to adjust power accordingly, so increased drag and less thrust started their airspeed to decay. The instructor either didn't pick up on the imminent danger, or he was trying to give the trainee some latitude to recognize and rectify the situation. Either way, within the scope of the few seconds available before reaching $V_{mc(a)}$, neither crew member made corrective action controlling the airspeed.

Recognition of errors and performing counter measures. The fact that the instructor specifically instructed the trainee to only use the right throttle for go-around at an airspeed below $V_{mc(a)}$ indicates that the instructor was likely not aware of the gravity of situation.

Conclusions

Causes

As a result of the investigation the IC concluded that the root cause of the accident was the decay of airspeed below $V_{mc(a)}$ in SE conditions, while the right engine power was increased to maximum, compounded by flawed situational awareness on the part of the instructor in his delay to act in time to prevent the accident.

In addition to the above, the IC identified the following contributing factors associated with inadequate compliance with rules and regulations.

- omission of adequate pre-flight preparation, discussion of training procedures and goals, as well as adequate flight briefing
- not completing basic SE drills required to engage in more complex SE exercises
- not observing altitude limitations for SE go-around drills
- disregarding the sequence of exercises set forth in the ATO's Training Manual
- missing ASI from the instructor's panel, reducing his ability to effectively monitor airspeed

Safety Recommendations

Actions and Measures taken by the ATO during the investigation period

In the initial phase of the investigation the ATO concerned have outlined and implemented the following risk-mitigating measures.

- The number of instructors authorized to provide ME Class Rating and ME Instrument Rating instruction have been reduced and, as much as practicable, only full time ATO instructors would be authorized for such assignments.
- Amendments concerning instructor supervision have been implemented in Chapter 11. of the ATO Training Manual. Certain training details have been reassigned directly into the Head of Training's responsibilities. According to the revised policy, each instructor will be subject to standardization inspections twice a year.
- The ATO's online booking system has been amended in a way that only allows instructors to be assigned for instruction flights if they have been successfully completed their standardization checks in each check period, within the preset deadline.

Safety Recommendations proposed by TSB Hungary

The IC issued no safety recommendation.

Dated in Budapest, on 24 April 2024.