BULLETIN

Serious incident

4-12-2018

involving

Tecnam P2002 JF

OY-EJM

FOREWORD

This bulletin reflects the opinion of the Danish Accident Investigation Board regarding the circumstances of the occurrence and its causes and consequences.

In accordance with the provisions of the Danish Air Navigation Act and pursuant to Annex 13 of the International Civil Aviation Convention, the safety investigation is of an exclusively technical and operational nature, and its objective is not the assignment of blame or liability.

The safety investigation was carried out without having necessarily used legal evidence procedures and with no other basic aim than preventing future accidents and serious incidents.

Consequently, any use of this bulletin for purposes other than preventing future accidents and serious incidents may lead to erroneous or misleading interpretations.

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General

File number:	2018-595
UTC date:	4-12-2018
UTC time:	08:45
Occurrence class:	Serious incident
Location:	Aarhus (EKAH)
Injury level:	None

Aircraft

Aircraft registration:	OY-EJM
Aircraft make/model:	Tecnam P2002 JF
Current flight rules:	Visual Flight Rules (VFR)
Operation type:	Instructional
Flight phase:	Take off
Aircraft category:	Fixed wing
Last departure point:	Aarhus (EKAH)
Planned destination:	Aarhus (EKAH)
Aircraft damage:	Minor
Engine make/model:	Rotax 912S

SYNOPSIS

Notification

All times in this report are UTC.

The Danish Transport, Construction and Housing Authority (DTCHA) notified the Aviation Unit of the Danish Accident Investigation Board (AIB) of the serious incident on 6-12-2018 at 12:04 hrs.

The AIB notified the DTCHA, the European Aviation Safety Agency (EASA), the Directorate-General for Mobility and Transport (DG MOVE) and the Italian Agenzia Nazionale per la Sicurezza del Volo (ANSV) on 14-12-2018 at 13:43 hrs.

The ANSV appointed a non-travelling accredited representative to the AIB safety investigation.

FACTUAL INFORMATION

History of the flight

The serious incident flight was a local school flight from Aarhus (EKAH) comprising lesson 1.9 of the airline transport pilot license (ATPL) syllabus and in addition was the first progress check.

The student pilot occupied the left seat and the flight instructor (FI) occupied the right seat.

A short field take off followed closely by a simulated engine failure exercise was part of the progress check.

Before the flight, the FI briefed the student pilot on the various elements and manoeuvres of the progress check.

During the pre-flight briefing, the FI and the student pilot discussed the simulated engine failure emergency procedure.

The student pilot stated that according to standard procedures, the first response was to lower the nose of the aircraft and to maintain a minimum indicated airspeed of 51 knots. The actual stall speed of the aircraft with the flaps in take-off position was 38 knots indicated airspeed.

The student pilot was supposed to be the sole manipulator of the aircraft controls during the flight, excepting FI inputs to simulate various emergencies.

After the short field take off from runway 28R intersection W, the aircraft climbed to 100-150 feet above ground level, before the FI gently pulled the throttle back allowing the student pilot to respond.

There was no immediate response from the student pilot, who maintained the pitch angle of the aircraft.

At that moment, the airspeed *was not close to the stall speed or close to 51 knots*, but the FI observed that there was no response from the student pilot to lower the nose of the aircraft, so the FI called out *speed*.

The FI got the impression that the student pilot *either got scared or panicked* because the reaction from the student pilot was a violent pull back on the control stick causing a rapid increase in pitch angle. Immediately after the aircraft nose dropped distinctively and a yawed to the left, which was perceived by the FI as a stall.

The initial response from the FI was to call out *my control* and to lower the nose of the aircraft even further.

The FI felt resistance when moving the control stick forward caused by the student pilot still maintaining backpressure on the control stick. The FI also felt resistance when applying pressure to the rudder pedals.

The student pilot did not *fight* the opposite control input from the FI, but the student pilot *kind of froze* and maintained backpressure throughout the flight that made it difficult for the FI to regain aircraft control.

Due to the low altitude, the FI used outside references, i.e. the runway to judge the aircraft height above the ground. As there was very little time to act before the aircraft potentially would hit the ground, the FI neither tried to remove the hand of the student pilot from the control stick nor increased engine power.

The aircraft regained forward momentum, increased airspeed and resumed flight, i.e. the wing became unstalled. The FI regained sufficient control to align the aircraft with the runway and briefly flared before the aircraft hit the runway.

The metal protection pin protruding from below the aircraft tail scraped along the runway surface during the flare.

The aircraft landed and stopped on the runway without further damage to the aircraft or any injury to the two occupants.

During the subsequent debriefing, the student pilot expressed that stress (perceived high workload) most likely caused his reaction to the simulated engine failure.

The serious incident occurred in daylight under visual meteorological conditions (VMC).

Injuries to persons

Injuries	*Crew*	*Passengers*	*Others*
Fatal			
Serious			
None	2		

Damage to aircraft

The metal pin protruding below the tail of the aircraft got scrape marks and bended.

Personnel information

License and medical certificate

The pilot - male, 28 years - was the holder of a valid EU Commercial Pilot License Airplane (CPL (A)) issued by the DTCHA on 30-1-2018.

The rating single engine piston (SEP)/Land was valid until 31-7-2020.

The rating Flight Instructor (A) was valid until 30-9-2021.

The medical certificate (class 1) was valid until 16-12-2019.

Flying experience

	Last 24 hours	Last 90 days	Total
All types	0	54	315
This type	0	51	177
Landings	0	154	706
Flight instructor, all types	0	40	40

Meteorological information

Aviation Routine Weather Report (METAR)

metar ekah 040850z auto 28019kt 9999ndv ncd 05/01 q1004=

metar ekah 040820z auto 28018kt 9999ndv ncd 05/01 q1004=

Organization and management information

General

The FI completed his training as a commercial pilot and as a FI at the Approved Training Organisation (ATO), where he subsequently worked as a FI in a full time position.

The 40 hours of flight instruction that the FI accumulated since obtaining the rating consisted of a mix of normal lessons, progress checks and solo flight releases (excluding first solo releases).

According to the ATO, the student pilot had not previously during flight training behaved in an unpredictable manner and there had not been any reason to apply special focus on the student pilot's performance or behaviour.

Lesson 1.9 was scheduled after 12:20 flight hours in the ATPL syllabus, and in addition to being the first progress check, it was also the last lesson before a student pilot's very first solo flight. This situation *often made student pilots nervous*.

In addition, the short field take off exercise closely followed by the simulated engine failure exercise likely resulted in student pilots experiencing a quite high stress level and workload.

In order to lower the workload and the perceived stress level, the FI allowed a transition period between the short field take off and the simulated engine failure, in order to give the student pilot *some time to relax*.

Even though it was not a requirement in the progress check pre-flight briefing, the FI included a discussion on the simulated engine failure exercise, because the FI *knew the risk* associated with this low altitude manoeuvre.

FI training

According to the ATO, the FI training syllabus included 10 hours of dual flight training, where the FI acted as a student pilot and introduced various *wrong* or unexpected control inputs and/or adverse behavior. Additionally, expected student pilot behavior was also included in the training.

The intended learning outcome was to prepare future FIs on how to act in similar scenarios during actual instructional flights, in order to handle situations in a safe manner.

FI restrictions

At the time of the serious incident, the ATO did not restrict newly graduated FIs from performing progress checks with student pilots.

The only exception was the last progress check before a student pilot ended a module, i.e. on a specific type of aircraft, a rating or a license. A senior FI or the Chief Flight Instructor (CFI) always performed these progress checks.

FIs with less than 100 hours of flight instruction and less than 25 supervised student solo flights were not allowed to authorize first solo flights or first cross-country flights.

According to EASA Part-FCL (Annex 1), Subpart J - Instructors, Section 2 - Specific requirements for the flight instructor — FI (in extract):

FCL.910.FI FI — Restricted privileges
(a) An FI shall have his/her privileges limited to conducting flight instruction under the supervision of an FI for the same category of aircraft nominated by the ATO for this purpose, in the following cases:

(1) for the issue of the PPL, SPL, BPL and LAPL;

(b) While conducting training under supervision, in accordance with (a), the FI shall not have the privilege to authorise student pilots to conduct first solo flights and first solo cross-country flights.

(c) The limitations in (a) and (b) shall be removed from the FI certificate when the FI has completed at least:

(1) for the FI(A), 100 hours of flight instruction in aeroplanes or TMGs and, in addition has supervised at least 25 student solo flights;

ANALYSIS

General

The below had, in the opinion of the AIB, no influence on the sequence of events:

- The license, the qualifications and the medical status held by the FI.
- The weather conditions.
- The technical status of the aircraft.

The progress check

The pre-flight briefing included a discussion on the short field take off and the simulated engine failure exercises, because the FI knew that these exercises generally were demanding for student pilots, and therefore could result in an increased stress level for the student pilots.

Additionally, the simulated engine failure exercise was performed at a low altitude, which potentially increased the risk, as the consequence of hitting the ground could be severe.

During the briefing, the student pilot correctly explained how to react in response to a simulated engine failure after take-off and for that reason, it seemed fair to assess that the student pilot was competent to perform the required tasks safely.

The reaction of the student pilot to the inflight simulated engine failure was at first to maintain the pitch angle of the aircraft resulting in a decreasing airspeed. In other words, the student pilot did not react as expected to the simulated engine failure.

A possible explanation for this reaction might be the perceived workload of having to perform two complex manoeuvres in rapid succession. A too high workload might cause a decrease in cognitive performance.

The perceived high stress level felt by the student pilot during the take-off and the subsequent simulated engine failure supported this.

The *speed* call out from the FI prompted the distinct reaction from the student pilot, which was contrary to the expected reaction and likely a result of a *fight-or-flight*" or an acute stress response, prompted by a desire to get away from the perceived danger, i.e. the ground below.

Whether it is possible or not to predict the behaviour of a low experience student pilot during a first progress check flight is difficult for the AIB to assess. Furthermore, a rather low experience level of

the FI combined with a corresponding limited experience of observing students during actual high mental workload situations makes the answer even more blurred.

However, the reaction of the FI following the upset was swift and successful.

The FI recovery was most likely a combination of an instinctive action (applying forward pressure on the control stick due to expert/naturalistic decision making) and a cognitive process leading to the decision of using outside visual references and concentrating on flaring the aircraft before hitting the ground.

FI restrictions

The ATO's limitations for FIs with less than 100 hours of flight instruction and less than 25 supervised student pilot solo flights complied with the EASA Part FCL requirements.

Preventive actions

Because of the serious incident, the ATO implemented the following preventive actions:

- Internal FI-meetings for all FIs included a briefing on the serious incident.
- All FIs received instructions on how to place their hands during flight in order to block a similar input from a student pilot, preventing a similar occurrence to develop.
- The FI training syllabus for future flight training incorporated the serious incident scenario.
- Future recurrence training for FIs now included training on how to handle the serious incident scenario.
- Student pilot lesson plans no longer included a simulated engine failure following a short field take off. The effect should be to decrease the level of difficulty of the exercise and thereby to lower the stress level of the student pilot.
- Following the serious incident, only unrestricted FIs would perform progress checks, i.e. only FIs with a minimum of 100 hours of flight instruction and a minimum of 25 supervised student solo flights, including being special trained to conduct the specific progress check.
- The ATO created and will maintain a list of named and internally approved instructors for the ATPL course specific progress checks.