Air Accident Investigation Unit
(Belgium)
Federal Public Service
Mobility and Transport
City Atrium
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Safety Investigation Report

Ref. AAIU-2024-04-07-01
Issue date: 01 October 2024
Status: Final

Scope: Limited

As per ICAO Annex 13 and EU regulation EU 996/2010, decisions regarding whether to conduct a civil aviation safety investigation, and the extent of an investigation, are based on many factors, including the level of safety benefit expected to be drawn from such an investigation.
For this occurrence, a limited-scope, fact-gathering investigation and analysis was conducted in order to produce a short summary report. The investigation mainly focussed on the actions and conditions directly relating to the occurrence and might not cover all aspects of the aircraft operation and/or possible underlying safety factors due to the expected safety benefit of it and/or the extent of evidence/resources available.

SYNOPSYS

Occurrence class	Accident
Occurrence category	Collision with obstacle(s) during take-off and landing (CTOL)
Date and time[1]	Sunday 07 April 2024 09:52 UTC
Location	Approach zone runway 23 of EBSP
Aircraft	Piper PA-28-181 Archer II
Aircraft category	Fixed wing - Small aeroplane (MTOW ≤ 5700 kg)
Location of departure	Aerodrome of Spa/La Sauvenière (EBSP)
Planned destination	Aerodrome of Spa/La Sauvenière (EBSP)
Type of operation	Non-commercial - Local
Phase of flight	Approach
Injuries	None
Aircraft damage	Substantial

What happened

In approach to Runway 23 of EBSP airfield, the airplane with 3 persons on board hit a tree with its left wing. The airplane landed safely afterwards.

[1] All time data in this report are indicated in UTC, unless otherwise specified

1 THE OCCURRENCE

The pilot arrived at the Spa airfield in the morning. He lives in the region and knows the airfield well.
The goal of today's flight was to fly over the lake of Robertville with two friends.

For the preparation of the flight, the pilot completed the Flight Promotion school's weight and balance form and printed it. The document was drawn up with a fuel quantity of 90 l. Subsequently, the plane was refueled “to the tap”, i.e. a quantity of 120 liters; Weight and balance were deemed to be still within limits.

The pilot consulted the METARs for Liège, Maastricht and St-Hubert, as well as the NOTAMS. After that, the pilot went around the plane, for pre-flight checks, oil change, etc.

The pilot is used to putting a cushion on the seat. But, while it is usually on board, on the back seat, that day it was not present. The pilot then raised the seat to the maximum height, but he was sitting lower than usual.
The pilot wanted to start the flight with a few touchdowns in order to regain good contact with the plane.

The plane took off around 11:45 a.m. after the engine run-up. The take-off roll went smoothly. The plane joined the circuit at an altitude of 2600 ft. As the pilot wanted to keep 500 ft above ground and EBSP has an altitude of 1534 ft, he aimed for an altitude of 2100 ft AMSL when turning to final. The pilot judged that the plane was a little high and reduced the throttle (last turn at 80 kt). He did not seek to make a major correction.

The pilot selected 1 notch of flaps in downwind, a 2nd notch in the base leg and the 3rd notch at the start of the final. The airspeed was then between 65-70 kt.

The pilot aimed for the very beginning of the tarmac and monitored the speed. He had a clear view of the entire runway and focused on the runway threshold. At one point, as he looked up (to see the runway), he noticed the treetops to his left. He tried to move away to the right, but felt a shock. At first glance, the pilot had the impression of having hit the trees below the plane. During the approach, he did not see any tree directly in front of him, but he still had the runway threshold in sight.

The aircraft continued the landing and landed safely on runway 23.

2 CONTEXTUAL INFORMATION

2.1 Damage to the airplane

The leading edge of the left wing of the airplane is deformed to a depth of 22 cm and a width of 81 cm, near the wing tip.

Figure 1: Damage to the wing

2.2 Personnel information

Table 1 : General pilot data

Age	61
License	PPL(A)
Ratings	SEP (land) valid until 31/07/2025 Night
Experience	The pilot had accumulated a total of 355:25 FH of flight time and was primarily flying the Piper PA-28 from Spa Airfield; he also flies in Luxembourg in a flying club. He completed a few introductory flights on the Cessna 172. The last flight took place on March 22, a 48-minute flight with an instructor. The previous flight dates from November 5, 2023. The pilot performs an average of 10 to 15 FHs per year

2.3 Aircraft information

Table 2 : General aircraft data

General	
Manufacturer	Piper Aircraft, Inc.
Model:	PA-28-181 Archer II
History	
Year of built:	1983
Registration:	Registered by the Belgian CAA
Serial:	28-8390085
Engine	
Engine type	carbureted, direct-drive, air-cooled, horizontally opposed, normally aspirated, reciprocating four-cylinder
Engine manufacturer and model	Lycoming O-360-A4M
Serial	L-30537-36A
Propeller	
Propeller type	Fixed-pitch two blade aluminium
Propeller manufacturer and model	Sensenich 76EM8S5-0-62
Serial	33616K

The airplane has an Airworthiness Review Certificate, valid until 15 July 2024.

2.4 Meteorological information

The airfield noted the following conditions at the time of the accident;

Wind: 210 degrees 13 kt, variable between 180 and 250 degrees
Temperature: 16 °C – dewpoint 8°C
QNH: 1017 hPa

The pilot had spoken with a school instructor before the flight and learned that the wind was quite turbulent and that he should not hesitate to do a go-around if necessary.

2.5 Aerodrome information

The aerodrome of Spa - La Sauveniere is located at 50° 28' 57" N – 005° 54' 37" E.
It is a class II (PPR), code 1 (runway length between 400m and 800m) aerodrome.
It has an elevation of 1534 ft and features an asphalt bi-directional runway;

- Runway 05: 799 x 30m (Right hand circuit)
- Runway 23: 716 x 30m (Left hand circuit)

Obstacles

The protection of aircraft against collision with obstacles in the vicinity of aerodromes is covered by the ICAO standards, translated in Belgium into an administrative document, the Circular GDF-04, issued by the BCAA.

The Obstacle Limitation Surfaces (OLS) are imaginary surfaces in the airspace around airports that define limits for the height and position of obstacles to ensure the safety of aircraft operations. There are:
Approach, take-off and climb surfaces
Transition surfaces
Horizontal internal surface
Conical surface
The approach take-off and climb surface is defined by a plane with a 5% inclination, limited as described hereunder. No obstacle (trees, crane, antenna, windmill) may protrude the surface.

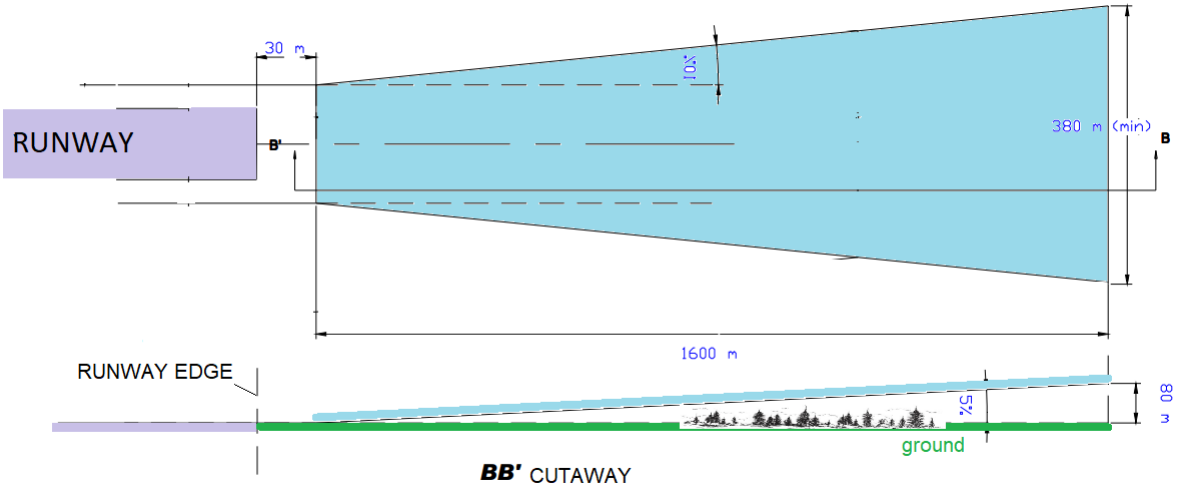

Figure 2: Approach, take-off and climb surface (in blue colour) for a code 1 aerodrome.

In the particular case of the topography of the aerodrome of Spa La Sauveniere, the terrain located in front of the runway edge slopes upwards. (WalOnMap website)

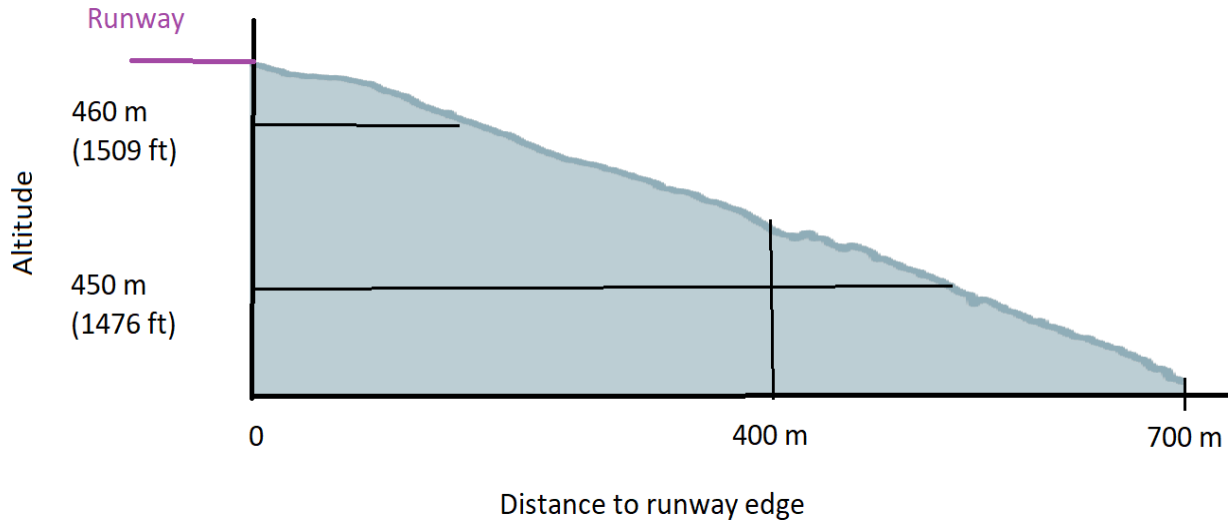

Figure 3: Topography in front of Runway 23

2.6 Recorded data

The pilot used a tablet computer with the SkyDemon software.
Some data of the flight were recorded (geographical position, ground speed and geometric height) at an average frequency of 0,3 Hz.

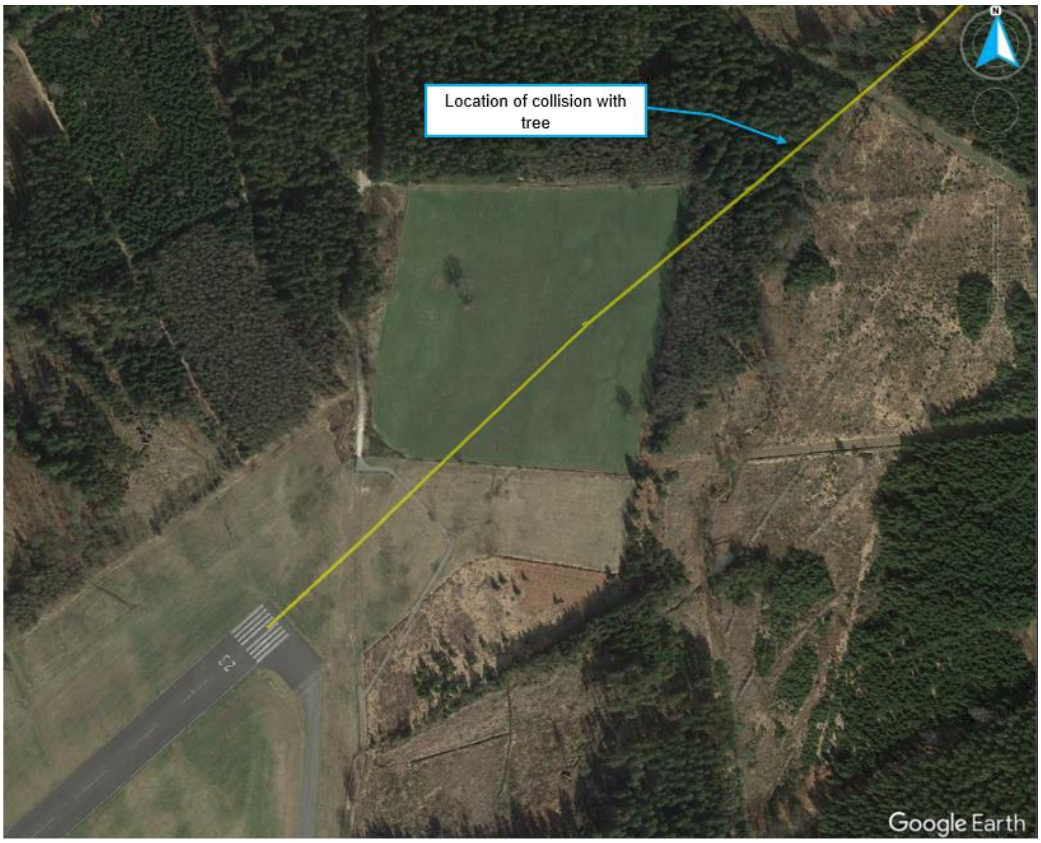

Figure 4 : Last part of the recorded flight

The airfield is equipped with CCTV, that showed the airplane during the approach.

Figure 5 : compilation of video stills, showing the moment of collision, followed by 'rocking' of the wings

3 ANALYSIS

3.1 Flight path

Using the data recorded in the Skydemon software, the approach flight path was reconstructed.

When the airplane hit the trees, it was flying at a distance of 500 m (1640 ft) from the threshold, well below the Obstacle Limitation Surface (OLS), having a 5% (3°) inclination and starting from 30 meters behind the runway threshold (see also Figure 2).

Figure 6 shows the vertical path compared to the OLS and approach paths of 3° and 5°, the range in which an approach is generally flown in general aviation.

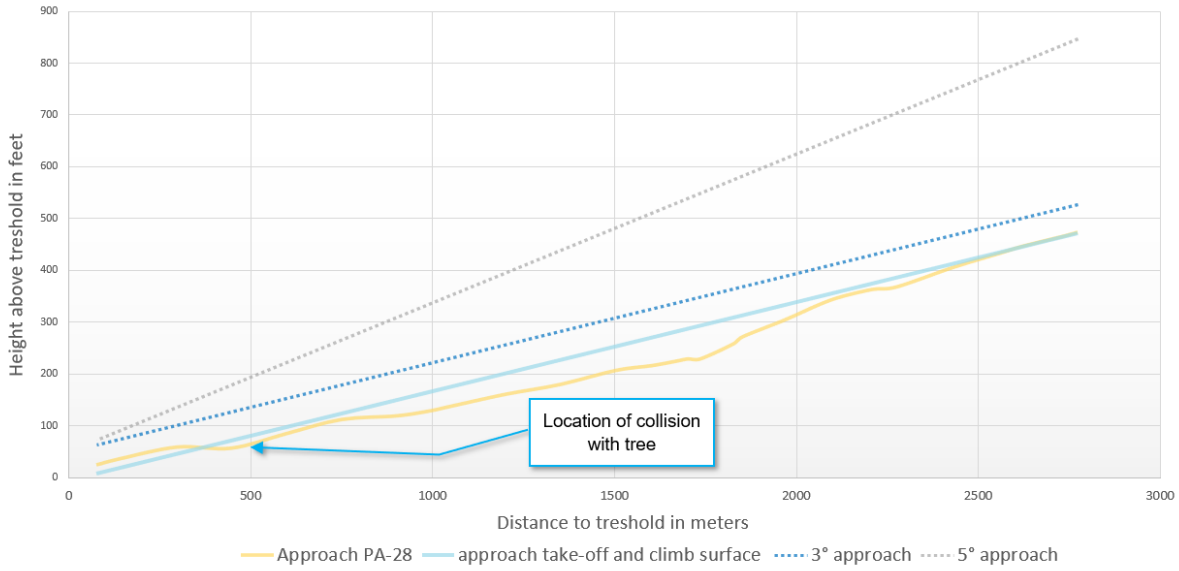

Figure 6: Flight path

The tree line is located at 400 m from the runway edge. For the sake of this investigation new measurements were carried out on the tree height compared to the OLS. The highest trees show a clearance of 8 – 14 m with respect to the OLS.

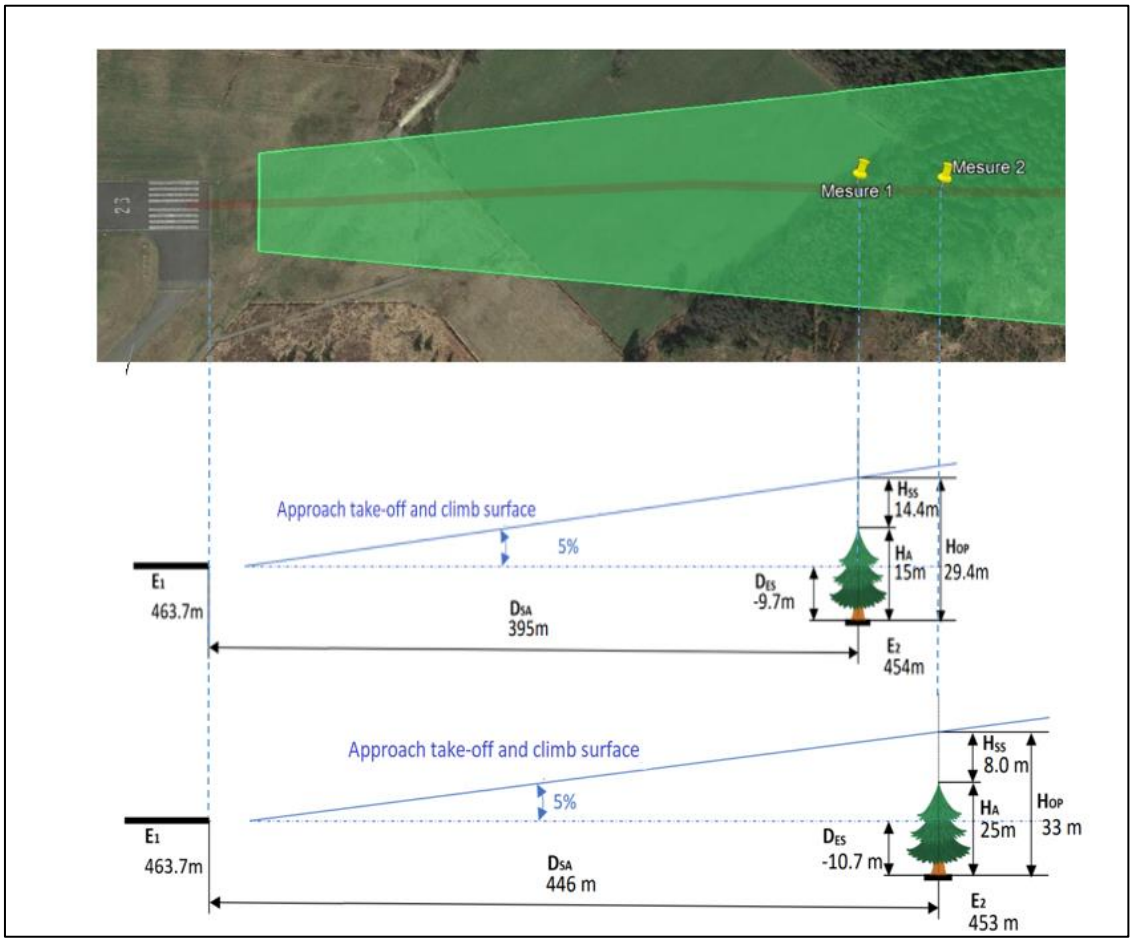

Figure 7 : result of post-accident measurements

3.2 Influence of the seating position of the pilot.

The pilot stated he was sitting lower than usual, in spite of having positioned the seat on the maximum height. He usually uses a cushion but this time, he did not find it on the aircraft.
In flight, this might have an influence on the pilot's perception of the flightpath angle. In addition, the instrument panel, being relatively higher than usual, may obstruct the pilot forward vision.

Full flaps were selected in the beginning of the final leg, which causes a pitch-down and thus an increase in visibility. In other words, the selection of the flaps didn't play a role in accident.

4 FINDINGS

4.1 Findings as to causes and contributing factors

- The pilot has a low recent experience, the last flight as PIC happened in November 2023. However he made a 'refresher flight' with a flight instructor 2 weeks before.
- The recorded data show the airplane flew an approach slope lower than 3 degrees from the horizontal.
- The pilot flew at a lower sitting position than what he is used to. This might have influenced his appreciation of the flight path.

4.2 Findings as to risks

- To improve his readiness for the flight, owing to a long period of inactivity, the pilot decided to make a few touch and goes before the navigation flight. However, in retrospect, these touch and goes could have been performed without passenger to lower the risk.

4.3 Other findings

- The pilot was qualified for the flight.
- The pilot made a 'refresher flight' with a flight instructor 2 weeks before.
- The Obstacle Limitation Surface for the approach to Runway 23 of the aerodrome of Spa La Sauveniere was verified and no protruding obstacles were found in the aircraft flight path.
- The pilot confirmed the visibility during approach was adequate.
- The selection of the flaps didn't play a role

5 SAFETY ACTIONS AND RECOMMENDATIONS

*A **safety issue** is a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organization or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.*

*A **safety action:** the steps taken or proposed to be taken by an organization or agency on its own initiative in response to a safety issue.*

*A **safety recommendation** is a proposal by the safety investigation authority in response to a safety issue and based on information derived from an investigation and/or study. It's aimed to improve the safety of an organisation and/or system and therefor always addressed to an organisation and/or agency, never to a specific individual. The sole purpose of a safety recommendation is the prevention of accidents or incidents and the reduction of the consequences of such occurrences. It, in no case has the purpose of creating a presumption of blame or liability for an accident or incident. Neither does it reflect the level of contribution to a specific accident or incident.*

*A **safety message:** An awareness which brings to attention the existence of a safety factor and the lessons learned. AAIU(Be) can distribute a safety message to a community (of pilots, instructors, examiners, ATC officers), an organization or an industry sector for it to consider a safety factor and take action where it believes it appropriate. There is no requirement for a formal response to a safety message, although AAIU(Be) will publish any response it receives.*

As no safety issues related to an organisation or a system were identified during this investigation, no safety recommendations are issued.

ABOUT THIS REPORT

General	
What?	Safety investigation reports are a technical document that reflects the views of the investigation team on the circumstances that led to the accident or serious incident and is conducted in accordance with Annex 13 to the Convention on International Civil Aviation and Regulation (EU) No 996/2010.
Objective	**The sole objective of safety investigations is the determination of the causes, and to define safety recommendations in order to prevent future accidents and incidents. It is not the purpose of this investigation to apportion blame or liability.** In particular, Article 17-3 of Regulation (EU) 996/2010 stipulates that the safety recommendations made in this report do not constitute any suspicion of guilt or responsibility.
Investigation authority	The Air Accident Investigation Unit of Belgium, (AAIU(Be) for the rest of this publication). It is the Belgian permanent national civil aviation safety investigation authority as defined in Article 4 of Regulation (EU) No 996/2010 and established in accordance with the Royal Decree of 8 December 1998. This unit is part of the Federal Public Service Mobility and Transport and is functionally independent from the Belgian Civil Aviation Authority and other interested parties.
This investigation	
Investigation initiation	AAIU(Be) was notified of the occurrence by Skeyes. it was decided to not travel to the scene of this incident.
Scope	**Limited** As per ICAO Annex 13 and EU regulation EU 996/2010, decisions regarding whether to conduct a civil aviation safety investigation, and the extent of an investigation, are based on many factors, including the level of safety benefit expected to be drawn from such an investigation. For this occurrence, a limited-scope, fact-gathering investigation and analysis was conducted in order to produce a short summary report. The investigation mainly focussed on the actions and conditions directly relating to the occurrence and might not cover all aspects of the aircraft operation and/or possible underlying safety factors due to the expected safety benefit of it and/or the extent of evidence/resources available.
Other parties involved	The personnel of the Spa – La Sauveniere aerodrome
	AAIU(Be) would like to thank the mentioned parties above and all other entities and individuals that have contributed to this safety investigation.