Havarikommissionen
Accident Investigation Board Denmark

PRELIMINARY REPORT

Accident

5-8-2019

Involving

Cessna 560 XLS+

D-CAWM

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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PRELIMINARY REPORT

General

File number:	2019-327
UTC date:	5-8-2019
UTC time:	22:36
Occurrence class:	Accident
Location:	Aarhus (EKAH)
Injury level:	None

Aircraft

Aircraft registration:	D-CAWM
Aircraft make/model:	Cessna 560 XLS+
Current flight rules:	Instrument Flight Rules (IFR)
Operation type:	Air taxi
Flight phase:	Landing
Aircraft category:	Fixed wing
Last departure point:	Oslo (ENGM)
Planned destination:	Aarhus (EKAH)
Aircraft damage:	Destroyed
Engine make/model:	2 Pratt & Whitney Canada, PW545C

SYNOPSIS

Notification

All date and time references in this report are Coordinated Universal Time (UTC).

The Area Control Center at Copenhagen Airport, Kastrup (EKCH), notified the Aviation Unit of the Danish Accident Investigation Board (AIB) of the accident on 5-8-2019 at 23:02 hours (hrs).

The Danish AIB notified the Danish Transport, Construction and Housing Authority (DTCHA), the German Federal Bureau of Aircraft Accident Investigation (BFU), the US National Transportation Safety Board (NTSB), the European Aviation Safety Agency (EASA), the Directorate-General for Mobility and Transport (DG MOVE), and the International Civil Aviation Organization (ICAO) on 7-8-2019 at 21:32 hrs.

The BFU accredited travelling representatives to the AIB safety investigation.

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

AIB preliminary safety investigation

Preliminary summary

On short final to runway 10R in Aarhus (EKAH) and with visual contact to the runway system, the flight crew descended below the glide path and deactivated a software safety barrier leading to a collision with the antenna mast system of the localizer for runway 28L.

The accident occurred in dark night and under Instrument Meteorological Conditions (IMC).

AIB safety investigation

This preliminary report reflects the results of the AIB preliminary safety investigation.

The AIB continues the safety investigation.

FACTUAL INFORMATION

History of the flight

The accident occurred during an IFR air taxi flight from Oslo (ENGM) to Aarhus (EKAH).

The flight was uneventful until the landing phase.

The commander was the pilot flying, and the first officer was the pilot monitoring.

At 22:09 hrs, the first officer established preliminary radio contact with Aarhus Tower (118.525 MHz) in order to obtain the latest weather report for EKAH.

The air traffic controller at Aarhus Tower communicated the following landing details:

- Expected landing on runway 10R
- Wind conditions to be 140° 2 knots
- Meteorological visibility to be 250 meters (m)
- Runway Visual Range (RVR) at landing to be 900 m, 750 m, and 400 m in fog patches
- Few clouds at 200 feet (ft), few clouds at 6500 ft
- Temperature 16° Celcius (C) and dewpoint 15° C
- QNH 1008 hPa.

The commander made an approach briefing for the Instrument Landing System (ILS) to runway 10R including a summary of standard operating procedures in case of a missed approach.

At established radio contact with Aarhus Approach (119.275 MHz) at 22:20 hrs, the air traffic controller instructed the flight crew to descend to altitude 3000 feet on QNH 1008 hPa and to expect radar vectors for an ILS approach to runway 10R.

The flight crew performed the approach checklist.

The flight crew discussed the weather situation at EKAH with expected shallow fog and fog patches at landing.

At 22:28 hrs, the air traffic controller instructed the flight crew to turn right by 10°, descend to 2000 ft on QNH 1008 hPa, and informed that low visibility procedures were in force at EKAH.

Due the weather conditions, the air traffic controller planned to set up the aircraft on a long final allowing the flight crew to be properly established before the final approach.

The commander called out the instrument presentation of an operative radio altimeter.

At 22:31 hrs, the air traffic controller instructed the flight crew to turn left on heading 130° and cleared the flight crew to perform an ILS approach to runway 10R.

The commander armed the approach mode of the aircraft Automatic Flight Control System (AFCS) and ordered a flap setting of 15°.

When established on the localizer for runway 10R and shortly before leaving 2000 ft on the glide path, the commander through shallow fog obtained visual contact with the runway.

The commander ordered a landing gear down selection.

The flight crew observed that a fog layer was situated above the middle of the runway.

The commander ordered a flap setting of 35°.

The aircraft was established on the ILS (localizer and glide path) to runway 10R in landing configuration.

At 22:32 hrs, the first officer reported to Aarhus Approach that the aircraft was established on the ILS to runway 10R.

The air traffic controller reported the wind conditions to be 150° 2 knots and cleared the aircraft to land on runway 10R.

The flight crew initiated the final checklist.

The first officer called visual contact with the runway lighting system, fog above the middle of the runway, and the touchdown zone and the runway end were both visible.

At approximately 900 ft Radio Height (RH), the commander disengaged the AFCS, and the flight crew completed the final checklist.

The first officer called *500 to minimum*, and the commander called *Runway in sight.*

The commander informed the first officer that the intention was to touch down at the beginning of the runway.

The aircraft started descending below the glide path for runway 10R.

The aircraft aural alert warning system announced passing 500 feet RH.

The first officer asked the commander whether to cancel the Enhanced Ground Proximity Warning System (EGPWS) Glide Slope (GS) warnings. The commander confirmed.

At approximately 500 ft RH, the Flight Data Recorder (FDR) recorded cancellation of the EGPWS GS warnings.

The first officer called *Approaching minimum.* Shortly after, the aircraft aural alert warning system announced *Minimums Minimums.*

The commander called *Continue.*

The flight crew made no callouts on stabilized approach.

The FDR recorded a glide path deviation beyond full scale (flying below).

The aircraft collided with the antenna mast system of the localizer for runway 28L, touched down in the grass Runway End Safety Area (RESA) for runway 28L, and the nose landing gear collided with a near field antenna (localizer for runway 28L) and collapsed.

The aircraft ended up on runway 10R.

The aircraft caught fire.

The passengers and the crew evacuated the aircraft through the passenger entrance door and met at a safe distance in front of the aircraft.

Injuries to persons

Injuries	*Crew*	*Passengers*	*Others*
Fatal			
Serious			
None	3	7	

Damage to aircraft

The aircraft was destroyed.

Other damage

There were damages to:

- the antenna mast system of the localizer for runway 28L located in front of runway 10R
- a near field antenna (localizer for runway 28L) located on the extended centreline between the localizer antenna mast system and runway 10R
- the runway surface on runway 10R.

Personnel information

License and medical certificate

a. The commander

The commander - male, 53 years - was the holder of an Air Traffic Pilot License (ATPL (A)) issued by Austro Control GmbH on 15-3-2016.

The rating C560 XL/XLS was valid until 31-3-2020.

The medical certificate (class 1) was valid until 27-1-2020. The medical certificate held the limitation: *Valid only with correction for defective distant vision.*

b. The first officer

The first officer - male, 36 years - was the holder of a Commercial Pilot License (CPL (A)) issued by Luftfart-Bundesamt on 18-8-2016.

The rating C560 XL/XLS COP IR was valid until 31-12-2019.

The medical certificate (class 1) was valid until 22-12-2019. The medical certificate held no limitations.

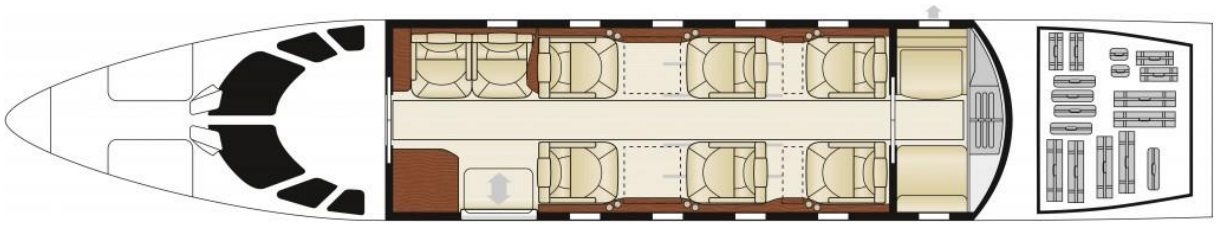
Aircraft information

General information

Manufacturer:	Textron Aviation Inc.
Type:	Cessna 560 XLS+
Serial number:	560-6002
Airworthiness review certificate:	Valid until 13-5-2020
Engine manufacturer:	Pratt & Whitney Canada
Engine type:	PW545C

Aircraft seating capacity

The aircraft had a seating capacity of nine passengers.



Technical status of the aircraft

Except repetitive aural alerts for windshield heating on approach to EKAH, the flight crew experienced no technical deficiencies.

Meteorological information

Terminal Aerodrome Forecast (TAF)

taf amd ekah 052100z 0521/0618 18007kt 9999 bkn025 tempo 0521/0524 0800 bcfg shra bkn012 sct020cb

taf amd ekah 052222z 0522/0618 18007kt 0200 fg sct002 becmg 0522/0524 8000 nsw tempo 0600/0608 4000 shra br bkn008 sct020cb becmg 0606/0609 26010kt tempo 0608/0613 -shra few020cb=

Aviation Routine Weather Report (METAR)

metar ekah 052150z auto 11002kt 0200ndv r10r/0500n r28l/0450d fg few002/// bkn067/// 16/16 q1008=

metar ekah 052220z auto 11001kt 0200ndv r10r/0650n r28l/0900n bcfg bkn064/// 16/16 q1008=

metar ekah 052250z auto 17002kt 0350ndv r10r/p1500u r28l/p1500n fg few001/// sct064/// bkn099/// 16/16 q1008=

Aids to navigation

The ILS, the Distance Measuring Eqipment (DME), and the Precision Approach Path Indicator (PAPI) for runway 10R were operative.

There were no reports of deficiencies.

Communication

The flight crew were in radio contact with Aarhus Tower (118.525 MHz) and Aarhus Approach (119.275 MHz).

The AIB obtained the involved Air Traffic Control (ATC) voice recordings. The recordings were of good quality and useful to the AIB preliminary safety investigation.

Aerodrome information

General information

Aerodrome Reference Point:	56 18 00.06N 010 37 08.43E
Elevation:	82 ft
Runway directions:	10R (098.5° MAG), 28L (278.5° MAG)
Runway dimensions	2702 meter (m) x 45 m
Runway surface:	Asphalt
Landing Distance Available (10R):	2702 m
RVR equipment runway 10R:	RVR measuring equipment at touchdown, midfield, and runway end were operative. There were no reports of deficiencies.

Aerodrome chart for EKAH

An extract of the Aeronautical Information Publication (AIP) Denmark.

See appendix 1.

Flight recorders

The BFU downloaded the FDR and the Cockpit Voice Recorder (CVR).

The downloaded data were of good quality and useful to the AIB preliminary safety investigation.

Wreckage and impact information

Approximately 450 m before the beginning of runway 10R (measured from the green threshold lights), the aircraft collided with the antenna mast system of the localizer for runway 28L.

At collision with the antenna mast system, the left wing fuel tank ruptured resulting in a fuel leakage.

Approximately 390 m before the beginning of runway 10R (measured from the green threshold lights), the aircraft touched down in the RESA for runway 28L (grass area).

After a landing roll of approximately 60 meters, the nose landing gear collided with the near field antenna of the localizer for runway 28L and collapsed.

While rolling on the main wheels and skidding on the nose section, the aircraft entered the stopway for runway 28L

The aircraft came to a full stop approximately 230 m after the beginning of runway 10R (measured from the green threshold lights).

Presence of fire

After the aircraft came to a stop on the runway, leaking fuel ignited and caught fire on the aft left-hand side of the fuselage.

Survival aspects

After the aircraft came to a stop on the runway, the crew initiated an on ground emergency evacuation of the aircraft.

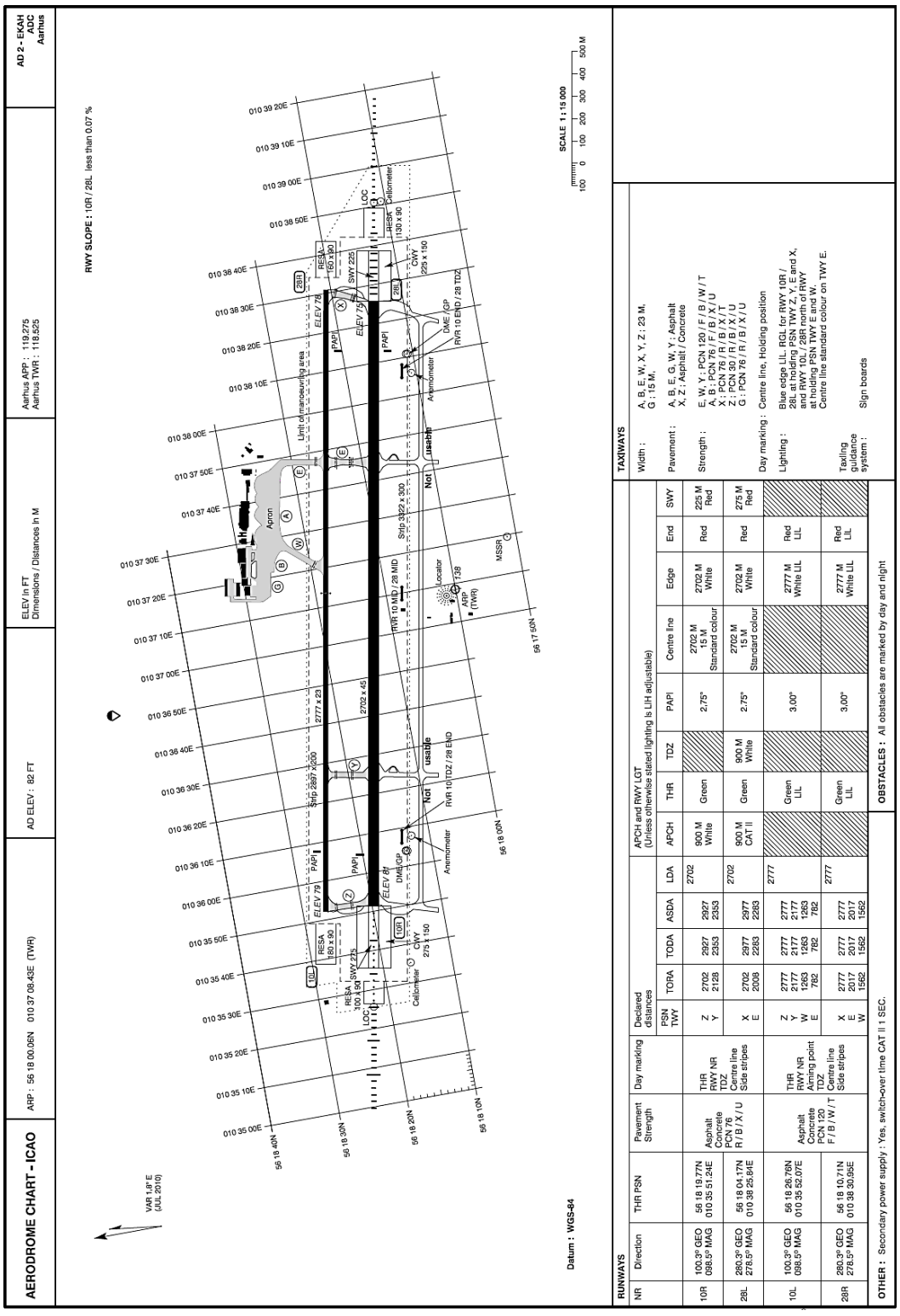
Furthermore, the flight crew notified Aarhus Approach of the accident.

Aarhus Approach alarmed the aerodrome fire and rescue services, and the aerodrome briefing office alarmed the emergency dispatch centre.

The passengers and the crew evacuated the aircraft through the passenger entrance door and met at a safe distance in front of the aircraft.

APPENDIX 1

Return to aerodrome chart for EKAH



RUNWAYS

NR	Direction	THR PSN	Pavement Strength	Day marking	Declared distances PSN TWY	TORA	TODA	ASDA	LDA	APCH and RWY LGT (Unless otherwise stated lighting is LIH adjustable) APCH	THR	TDZ	PAPI	Centre line	Edge	End	SWY
10R	100.3° GEO 098.5° MAG	56 18 19.77N 010 35 51.24E	Asphalt Concrete PCN 76 R / B / X / U	THR RWY NR TDZ Centre line Side stripes	Z Y	2702 2126	2927 2353		2702	900 M White	Green		2,75°	2702 M 15 M Standard colour	2702 M White	Red	225 M Red
28L	280.3° GEO 278.5° MAG	56 18 04.47N 010 38 25.94E			X E	2702 2009	2977 2283	2977 2283	2702	900 M CAT II	Green	900 M White	2,75°	2702 M 15 M Standard colour	2702 M White	Red	275 M Red
10L	100.3° GEO 098.5° MAG	56 18 26.76N 010 35 52.07E	Asphalt Concrete PCN 76/R/B/X/U	THR RWY NR Aiming point TDZ Centre line Side stripes	Z Y W E	2777 2177 1263 782	2777 2177 1263 782	2777 2177 1263 782	2777		Green LIL		3,00°		2777 M White LIL	Red LIL	
28R	280.3° GEO 278.5° MAG	56 18 10.71N 010 38 30.95E	F / B / W / T		X E W	2777 2017 1562	2777 2017 1562	2777 2017 1562	2777		Green LIL		3,00°		2777 M White LIL	Red LIL	

TAXIWAYS

Width : A, B, E, W, X, Y, Z : 23 M.
G : 15 M.

Pavement : A, B, E, G, W, Y : Asphalt
X, Z : Asphalt / Concrete

Strength : E, W, Y : PCN 120 / F / B / W / T
A, B : PCN 76 / F / B / X / U
X : PCN 76 / R / B / X / T
Z : PCN 30 / R / B / X / U
G : PCN 76 / R / B / X / U

Day marking : Centre line, Holding position

Lighting : Blue edge LIL. RGL for RWY 10R / 28L at holding PSN TWY Z, Y, E and X, and RWY 10L / 28R north of RWY at holding PSN TWY E and W.
Centre line standard colour on TWY E.

Taxiing guidance system : Sign boards

OTHER : Secondary power supply : Yes, switch-over time CAT II 1 SEC.

OBSTACLES : All obstacles are marked by day and night