Havarikommissionen
Accident Investigation Board Denmark

FINAL REPORT

Accident

6-6-2015

involving

AVIONS ROBIN DR400

HB-KFV

ECCAIRS Release 5

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FOREWORD

This report 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 investigation is of an exclusively technical and operational nature, and its objective is not the assignment of blame or liability.

The 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 report for purposes other than preventing future accidents and serious incidents may lead to erroneous or misleading interpretations.

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FINAL REPORT

General

File number:	HCLJ510-2015-289
UTC date:	6-6-2015
UTC time:	08:37
Occurrence class:	Accident
Location:	Endelave (EKEL)
Injury level:	Minor

Aircraft

Aircraft registration:	HB-KFV
Aircraft make/model:	AVIONS ROBIN DR400
Current flight rules:	Visual Flight Rules (VFR)
Operation type:	Non-Commercial Operations Pleasure Cross Country
Flight phase:	Landing
Aircraft category:	Fixed Wing Aeroplane
Last departure point:	Denmark EKAE: Aero
Planned destination:	Denmark EKEL: Endelave (Private Ad)
Aircraft damage:	Destroyed
Engine:	LYCOMING 320 FAMILY (O-320-D2A)

SYNOPSIS

Notification

All times in this report are UTC.

The Aviation Unit of the Danish Accident Investigation Board (AIB) was notified of the accident by the Area Control Centre at Copenhagen Airport Kastrup (EKCH) on 6-6-2015 at 08:55 hours.

The Danish Transport and Construction Agency (DTCA), the Swiss Transportation Safety Investigation Board (STSB), the European Aviation Safety Agency (EASA), the Directorate-General for Mobility and Transport (DG MOVE) were notified on 8-6-2015.

The French Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (BEA) was notified on 10-12-2015.

The STSB and the BEA appointed accredited non-travelling representatives to the investigation.

Summary

During the flare of the aircraft, the aircraft was exposed to a stall resulting in a loss of control in flight and a consequential hard landing.

A prolonged landing roll distance combined with an aircraft heading towards a nearby building and windbreak trees reduced the pilot's options of avoiding impact with obstacles.

The accident occurred in daylight and under visual meteorological conditions (VMC).

The AIB safety investigation did not result in recommendations being made.

1 FACTUAL INFORMATION

1.1 History of the flight

The accident occurred during a private VFR flight from a public grass airstrip on the island of Aero (EKAE) to a private grass airstrip on the island of Endelave (EKEL).

The aircraft made an approach to runway 29 at EKEL.

On final approach to runway 29, the pilot experienced crosswind conditions and moderate turbulence.

The pilot observed the final approach speed to be approximately 64 knots.

Just after having passed overhead the threshold to runway 29, the pilot experienced a sudden drop of aircraft lift resulting in a high sink rate. The aircraft made a hard landing.

The aircraft got airborne and flew approximately 55 meters before the second touchdown.

During the ground roll, the pilot for a short while added engine power for initiating an aborted landing, but decided to retard the engine power to idle power for making a full stop.

The aircraft heading was approximately 280°.

In order to avoid obstacles, the pilot unsuccessfully tried to regain directional control.

For approximately 97 meters, the aircraft continued on heading 280° until it impacted with windbreak trees and a parked runway roller along the runway side.

Recording of the final approach and the touch down

In order to view the recording, please make sure that an appropriate internet connection is available.

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Others*
Fatal			
Serious			
Minor	1	1	

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

There were damages to the windbreak trees along the runway side and a runway roller parked close to the windbreak trees.

1.5 Personnel information

1.5.1 License and medical certificate

The pilot (43 years) was the holder of a Swiss private pilot license (PPL (A)), initially issued on 14-9-2009.

The rating single engine piston land (SEP (land)) was valid until 30-9-2015.

The medical certificate (class 2) was valid until 27-8-2015.

1.5.2 Flying experience

	Last 24 hours	Last 90 days	Total
All types	3:20	4.20	135:26
This type	3:20	4.20	104:09
Landings this type	1	5	163

1.5.3 Pilot experience with EKEL

The pilot had no previous experience of operating on the airstrip.

1.6 Aircraft information

1.6.1 General

Aircraft manufacturer:	Avions Pierre Robin
Manufacturer's designation:	DR400-140B
Aircraft serial number:	2529
Engine:	Textron Lycoming O-320-D2A
Propeller:	Sensenich fixed pitch propeller
Aircraft approval:	VFR by day in non-icing conditions
Airworthiness certificate:	Valid until 16-4-2016
Empty mass:	625 kilo (kg)
Maximum take-off mass:	1 000 kg (normal category)
Maximum landing mass:	1 000 kg (normal category)
Crosswind limitation:	22 knots (demonstrated)

1.6.2 Aircraft log

Aircraft flight hours:	4800.64 tacho hours (6-6-2015)
Aircraft landings:	11942 (6-6-2015)

1.6.3 Mass and balance calculation

The mass and balance calculation was made by the pilot.

See appendix 5.1.

1.7 Meteorological information

1.7.1 Forecast for Jutland

The island of Endelave is located in the area 1b.

FBDN22 EKCH 060300
FORECAST FOR AREA D, JUTLAND
VALID THE 6 OF JUNE 2015 BETWEEN 04:00 AND 10:00 HOURS

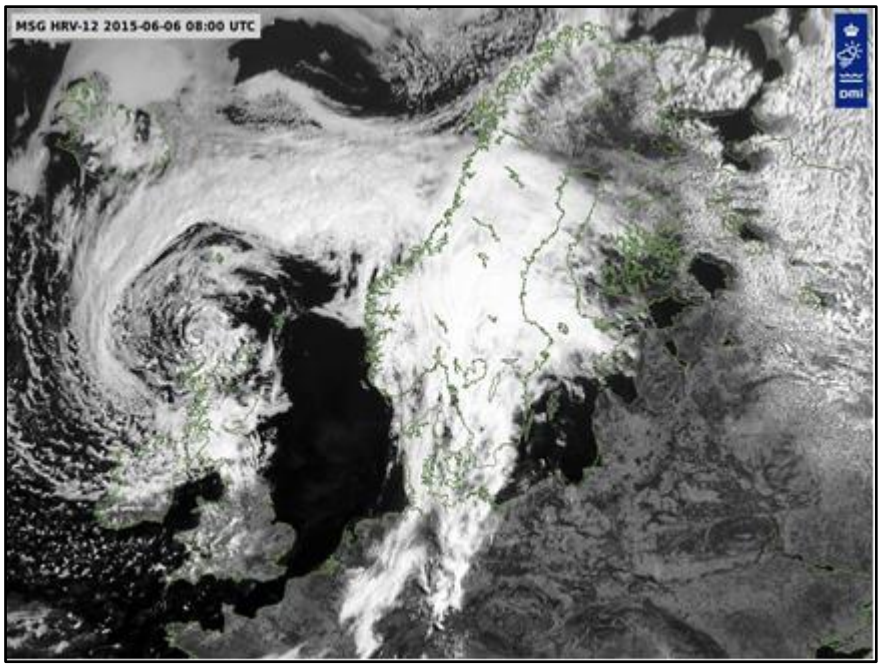
Turbulence:	Is not expected during the forecasted period
Icing (in the whole area except area 2c):	In the beginning and middle of the period light to moderate ice between flight level (FL) 100 and above FL 125
Icing (area 2 c):	In the beginning and middle of the period light to moderate ice between FL100 and above FL125.At the end of the period light to moderate ice between FL110 and above FL125
Visibility/weather/clouds (area 1b, 2b, 2c):	During the whole period visibility over 8 kilometers (km), locally 3000-5000 meters (m) in showers of rain. Cloud base over 4000 feet (ft). Isolated embedded cumulonimbus (CB). Cloud top above FL 125
Zero degree isotherm (the whole area):	Zero degree at FL 100. Later zero degree at FL 85
Surface winds (area 1a, 1b):	Southeast (SE) - south (S)/10 knots (kt), later southwest (SW) - west (W)/15 knots (kt)
Wind and temperature (2000 ft - the whole area):	220/30 kt +15, later 260/25 kt +13
Wind and temperature (FL 50 - the whole area):	210/35 kt +11, later 240/35 kt +8
Wind and temperature (FL 100 - the whole area):	210/45 kt +1, later 220/60 kt +1

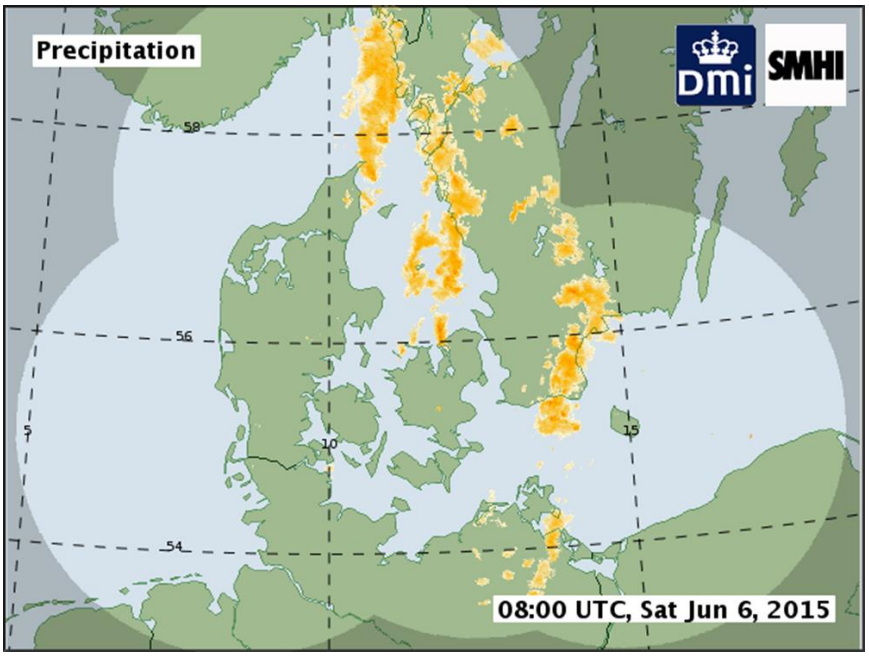
Lowest QNH:	1009 hPa
Additional information:	Occurrence of towering cumulus (CU) or CB always implies risk of moderate/severe icing and turbulence even though not stated explicitly in the forecast

1.7.2 Aftercast

Overview:	During the morning hours, an east moving cold front with light rain passed the route and the island of Endelave. West of the cold front, the air mass still was humid
Weather:	Only local light rain/drizzle and partly light haze
Visibility:	In the area of Aero and the southern part of Funen 6-9 kilometers (km) in haze. Otherwise 10 km or above
Clouds:	Above the island of Aero and the southern part of Funen 4-7/8 stratocumulus (sc) with a cloud base of 1100-1500 ft and with varying cloud layer above. Otherwise in general, cloud bases above 4000 ft, but banks of 4-7/8 sc at 1000-1500 ft above the island of Endelave might have been present
Zero degree isotherm:	Above 10000 feet
Icing:	None
Turbulence:	None to light thermal. No mechanical
Surface wind:	200-220°, 12-14 kt
Altitude wind (1 500 feet):	260° 27 kt
Windshear:	None of significance

1.7.3 Weather radar





1.7.4 Windsock

The windsock was located north of the airstrip.

The picture below is taken just before the aircraft impacted with windbreak trees in front of the aircraft and along the runway side.

1.8 Aids to navigation

Not applicable.

1.9 Communication

Enroute from EKAE to EKEL, the pilot was in radio contact with Copenhagen Information.

EKEL was not equipped with radio communication facilitates.

1.10 Aerodrome information

1.10.1 EKEL

EKEL was a private grass airstrip on the island of Endelave.

The below text is an extract from the Airfield Manual Denmark.

Location:	0.9 nautical miles west of Endelave city
GPS position:	N55 45.4 E010 14.9
Elevation:	16 feet
Runway directions:	11/29
Dimensions - surface:	650 x 20 meters - grass

1.10.2 Location of EKEL

See appendix 5.2.

1.10.3 Runway conditions

At the time of the accident, the grass surface was even, and the grass was short and dry.

1.11 Flight recorders

Neither flight recorders were installed nor required.

1.12 Wreckage and impact information

1.12.1 Landing sequence

The aircraft touched down 62 meters west of the threshold to runway 29 and got airborne. The aircraft flew approximately 55 meters before the second touchdown.

Upon the second touchdown, main wheel brake marks (approximately 4 meters) were observed.

The aircraft heading was approximately 280°.

On an aircraft heading of approximately 280°, the aircraft rolled 97 meters until it impacted with windbreak trees and a parked runway roller (located 214 meters west of the threshold to runway 29) along the runway side.

Overview of the accident site - see appendix 5.3.

Accident site - direction towards the West

1.12.2 Wreckage

As a consequence of impacting with the windbreak trees along the runway side and a parked runway roller, the aircraft wings and tail section separated from the aircraft fuselage.

The forward part of the aircraft fuselage (cockpit) did not impact with the windbreak tress and the runway roller and remained intact.

The flaps at impact were in landing position (2nd notch).

1.12.3 AIB technical investigation

The AIB onsite technical investigation did not reveal technical failures or malfunctions occurring before the aircraft impacted with the windbreak trees and the runway roller.

1.13 Medical and pathological information

Not applicable.

1.14 Fire

There was no fire.

1.15 Survival aspects

1.15.1 General

The pilot and the passenger used hip and shoulder harnesses.

The impact sequence reduced the risk of serious injuries to the pilot and the passenger.

The accident was survivable.

1.15.2 Witnesses

Witnesses, who observed the sequence of events, alerted the local authorities.

1.16 Tests and research

None.

1.17 Organization and management information

Not applicable.

1.18 Additional information

1.18.1 The pilot's operating handbook (extracts)

1.18.1.1 Normal procedures

Final

Carburator heat	*Full out (push in)*
Flaps	*Below 150 km/t (81 kt) (2nd notch) landing position*
Approach speed	*(62 knots) 115 km/h*
Elevator trim	*Set*

Short landing

Flaps	*(2nd notch) landing position*
Approach speed	*(with throttle setting)(62 kt) 115 km/h*

After touch down, brake heavily keeping nose up with elevator and retracting flaps.

Landing in crosswind or gusty conditions

Flaps	*(1st notch) take off position*
Approach speed	*(70 knots) 130 km/h + 1/2 gust speed*
Drift	*Correct in the normal way*
Demonstrated crosswind	*(22 kt) 40 km/h*

1.18.1.2 Performance

Stall speeds

Engine idling, *Weight: 1000 kg (2205 lbs)*	*Km/h (kt)*		
Bank angle	*0°*	*30°*	*60°*
Flaps up	*99 (54)*	*106 (58)*	*140 (76)*
Flaps 1st notch, take off position	*93 (51)*	*99 (54)*	*131 (71)*
Flaps 2nd notch, landing position	*87 (47)*	*93 (51)*	*123 (67)*

1.19 Useful or effective investigation techniques

None.

2 ANALYSIS

2.1 General

The license, the qualifications and the medical status held by the pilot, the technical status of the aircraft, and the aircraft mass and balance had, in the AIB's opinion, no influence on the sequence of events.

2.2 The weather conditions

Generally seen, the weather conditions were good and did not give rise to any flight operational limitations.

The actual weather conditions in the area of EKEL were equivalent to the forecasted weather conditions.

The forecasted wind conditions at EKEL were equivalent to the actual wind conditions (windsock) resulting in a crosswind component during the landing phase (above the height of the trees along the southern side of the runway) of approximately 12-15 knots and a headwind component of 4-5 knots.

2.3 The landing

On final to runway 29, the pilot observed the final approach speed to be 64 knots, and the flaps were set in the landing position (2nd notch).

The pilot most likely made use of the final and short landing procedures (an approach speed of 62 knots - flaps set in the landing position (2nd notch)).

In the opinion of the AIB, use of the landing in crosswind conditions procedure (an approach speed of 70 knots - flaps set in the take-off position (1st notch)) might in this occurrence have increased the safety margins to stall.

The AIB finds it probable that a combination of crosswind conditions, moderate turbulence, non-experience with EKEL and a subsequent short field landing on grass might mentally have reduced the pilot's attention on airspeed, while keeping external focus on remaining established on short final to runway 29.

Passing the threshold to runway 29 with the engine power at idle power and flying with an approach speed most likely below the minimum approach speed, the pilot apparently initiated the flare of the aircraft at a higher than optimum flare altitude.

During the flare of the aircraft, the combination of further airspeed reduction and the aircraft coming below the height and in lee of the trees along the southern side of the runway led to at stall resulting in a loss of control in flight and a consequential hard landing.

2.4 The landing roll

During the landing roll, the pilot was in doubt about whether to abort the landing or to make a full stop.

The prolonged landing roll distance combined with an aircraft heading towards the nearby building and the windbreak trees reduced the pilot's options of avoiding impact with obstacles.

3 CONCLUSIONS

3.1 Findings

1. The license, the qualifications and the medical status held by the pilot, the technical status of the aircraft, and the aircraft mass and balance had no influence on the sequence of events
2. The weather conditions were good and did not give rise to any flight operational limitations
3. The actual weather conditions in the area of EKEL were equivalent to the forecasted weather conditions
4. The forecasted wind conditions at EKEL were equivalent to the actual wind conditions
5. On final to runway 29, the pilot observed the final approach speed to be 64 knots, and the flaps were set in the landing position (2nd notch)
6. The use of the landing in crosswind conditions procedure (an approach speed of 70 knots - flaps set in the take-off position (1st notch)) might in this occurrence have increased the safety margins to stall
7. A combination of crosswind conditions, moderate turbulence, non-experience with EKEL and a subsequent short field landing on grass might mentally have reduced the pilot's attention on airspeed, while keeping external focus on remaining established on short final to runway 29
8. Passing the threshold to runway 29 with the engine power at idle power and flying with an approach speed most likely below the minimum approach speed, the pilot apparently initiated the flare of the aircraft at a higher than optimum flare altitude
9. During the flare of the aircraft, the combination of further airspeed reduction and the aircraft coming below the height and in lee of the trees along the southern side of the runway led to a stall resulting in a loss of control in flight and a consequential hard landing
10. At the time of the accident, the grass surface was even, and the grass was short and dry
11. During the landing roll, the pilot was in doubt about whether to abort the landing or to make a full stop
12. The prolonged landing roll distance combined with an aircraft heading towards the nearby building and the windbreak trees reduced the pilot's options of avoiding impact with obstacles
13. The impact sequence reduced the risk of serious injuries to the pilot and the passenger
14. The accident was survivable

3.2 Factors

1. During the flare of the aircraft, the combination of further airspeed reduction and the aircraft coming below the height and in lee of the tress along the southern side of the runway led to a stall resulting in a loss of control in flight and a consequential hard landing
2. The prolonged landing roll distance combined with an aircraft heading towards the nearby building and the windbreak trees reduced the pilot's options of avoiding impact with obstacles

3.3 Summary

During the flare of the aircraft, the aircraft was exposed to a stall resulting in a loss of control in flight and a consequential hard landing.

A prolonged landing roll distance combined with an aircraft heading towards a nearby building and windbreak trees reduced the pilot's options of avoiding impact with obstacles.

The accident occurred in daylight and under visual meteorological conditions (VMC).

4 SAFETY RECOMMENDATIONS

The AIB safety investigation did not result in recommendations being made.

5 APPENDICES

5.1 Mass and balance

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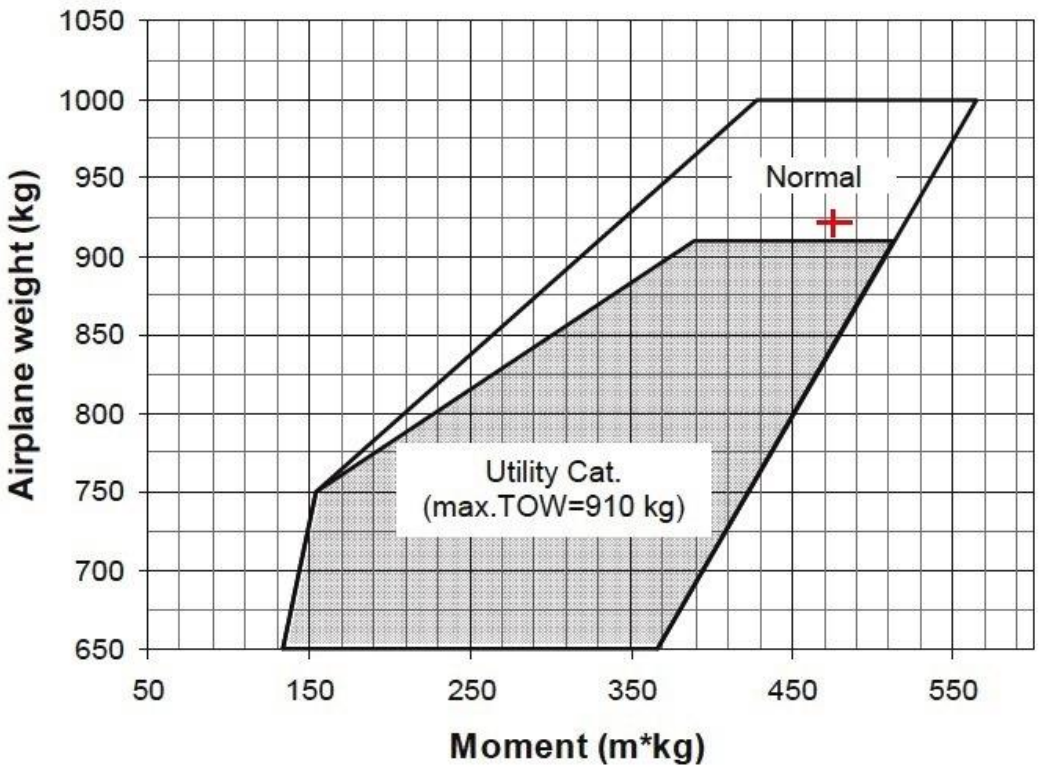
Mass and balance calculation made by the pilot			
HB - KFV		WEIGHT (kg)	MOMENT (mkg)
A/C empty: HB - KFV		625	211
Pilot + Pax Front Seats		150	62
Pax Rear Seats		40	47.6
Bagage (max. 40 kg)		20	38
Total Fuel Haupttank (	70 Ltr)	50	56
Total Fuel Zusatztank (	50 Ltr)	36	58
Landing mass		921	472.6



5.2 Location of EKEL

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5.3 Accident site

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