

CONTENTS

SPECIAL BULLETINS / INTERIM REPORTS

S7/2013 - AS332 L2 Super Puma,	G-WNSB	23-Aug-13	3
--------------------------------	--------	-----------	---

AAIB FIELD INVESTIGATIONS

COMMERCIAL AIR TRANSPORT

FIXED WING

Boeing 737-377	G-CELS	01-Mar-13	13
----------------	--------	-----------	----

ROTORCRAFT

None

GENERAL AVIATION

FIXED WING

None

ROTORCRAFT

None

SPORT AVIATION / BALLOONS

None

AAIB CORRESPONDENCE INVESTIGATIONS

COMMERCIAL AIR TRANSPORT

Airbus A330-243	G-OMYT	24-Jun-13	17
BAe 146-300	EC-LOF	19-Sep-13	19
Beechcraft BE58 Baron	G-BTFT	02-Sep-13	21
Beechcraft 58TC Baron	N6751W	30-Jul-13	23
Piper PA31-350 Navajo Chieftan	VQ-TAC	28-Jun-13	24

GENERAL AVIATION

AS350B Ecureuil	G-JESI	03-Aug-13	26
Champion 7ECA Citabria Aurora	G-EGWN	18-Jul-13	28
Cirrus SR22,	N936CT	06-Jun-13	30
DH60G Gipsy Moth	G-AAZG	12-Aug-13	35
Gardan GY80-160 Horizon	G-ASZS	14-Aug-13	37
Lancair 320	G-PJMT	09-Jun-13	38
Morane Saulnier MS.893A			
Rallye Commodore 180	G-AVVJ	17-Aug-13	40
Piper PA-28-140 Cherokee	G-DIAT	30-Aug-13	41
Piper PA-28-161 Cherokee Warrior II	G-BSVG	04-Sep-13	43

AAIB CORRESPONDENCE INVESTIGATIONS Cont

GENERAL AVIATION Cont

Reims Cessna FRA150M Aerobat	G-BFGZ	26-Jul-13	44
Socata TB20 Trinidad	G-TBXX	07-Jul-13	45
Yak C 11	G-BTZE	11-Aug-13	47
Zenair CH 250 Zenith	G-RAYS	19-Aug-13	48
Zenair CH 601HD Zodiac	G-BVAC	22-Aug-13	49

SPORT AVIATION / BALLOONS

Christen A-1 Husky	G-WATR	07-Aug-13	51
EV-97 TeamEurostar UK	G-CEFZ	26-Aug-13	54
Ikarus C42	PH-3L3	17-Jul-13	55
Ikarus C42 FB UK	G-ILRS	05-Oct-13	56
Kiss 400-582(1)	G-CBMX	31-Aug-13	58
P & M Aviation QuikR	UR-KWIK	07-Jul-13	59
Pegasus Quantum 15	G-CCRT	07-Jul-13	60
SLA 80 Executive	G-CCJJ	10-Aug-13	61
Zenair CH 601UL Zodiac	G-BZEV	15-Jun-13	62
Zenair CH 601UL Zodiac	G-CDAK	29-Sep-13	64

MISCELLANEOUS

ADDENDA and CORRECTIONS

Valentin Taifun 17E,	D-KFIH	11-Aug-13	67
----------------------	--------	-----------	----

List of recent aircraft accident reports issued by the AAIB			68
---	--	--	----

(ALL TIMES IN THIS BULLETIN ARE UTC)

AAIB Special Bulletins / Interim Reports

AAIB Special Bulletins and Interim Reports

This section contains Special Bulletins and Interim Reports that have been published since the last AAIB monthly bulletin.

Airport. The intention was to refuel the helicopter at Sumburgh, before returning to Aberdeen. The helicopter lifted from the Borgsten Dolphin platform at 1612 hrs, with the commander acting as the Pilot Flying (PF) and the co-pilot as the Pilot Not Flying (PNF)¹.

The flight towards Sumburgh was uneventful, except for the commander experiencing a problem with his collective pitch trim release switch on a number of occasions when adjusting the collective lever position. The problem appeared to have been resolved by both pilots exercising their respective switches and did not significantly affect the conduct of the flight. It did not occur during the approach phase.

Whilst en-route, the crew requested radar vectors to the final approach course for Runway 09; the request was acknowledged by Sumburgh Air Traffic Control (ATC).

At 1626 hrs the crew listened to the 1620 hrs Sumburgh ATIS information 'Whisky'. This gave the weather conditions as: surface wind from 150° at 18 kt, visibility 4,000 m in haze, scattered cloud at 300 ft, broken cloud at 500 ft, temperature +15°C, dew point +14°C and pressure 1014 hPa.

At 1648 hrs, Sumburgh ATC informed the crew of the latest weather. The visibility was 2,800 m in mist, with few clouds at 200 ft and broken cloud at 300 ft. The commander briefed for the 'SUB' LOC/DME Non-Precision Approach² to Runway 09 at Sumburgh Airport. The Minimum Descent Altitude (MDA)³ for the approach was 300 ft and the Automatic Voice Alarm

Device (AVAD) bugs were set accordingly. The plan was that the commander would fly the approach while the co-pilot monitored the vertical descent profile with reference to the published approach chart. The commander briefed that he would reduce the airspeed to 80 kt for the latter stage of the approach.

At 1702 hrs, the 'Approach' and 'Before Landing' checklists had been completed. The helicopter, receiving a radar control service from Sumburgh ATC, was vectored to the north of Sumburgh before being turned onto a south-easterly heading and being cleared to intercept the localiser⁴ for Runway 09.

The autopilot was engaged in Heading (HDG) and Altitude (ALT) modes, with the APP push button selected on the Automatic Flight Control Panel (AFCP). The localiser was captured at 1714 hrs. At 6.4 DME 'SUB', the commander initiated the descent using the autopilot vertical speed (V/S) mode with a selected rate of 500 ft/min. A cross-check by the co-pilot at 5 nm and 1,670 ft indicated to the crew that they were on the correct vertical profile. There were further checks at 4 nm and 3 nm, which confirmed that the vertical profile was being maintained.

At 3 nm the airspeed was 110 kt and reducing. At approximately 2.3 nm, the commander noted that the airspeed was 80 kt and increased the collective pitch, intending to maintain this speed. However, the helicopter's airspeed reduced below 80 kt and continued to reduce, unobserved by the crew.

At 2.0 nm the co-pilot advised the commander that the height at 1 nm should be 390 ft. The co-pilot made a call at 100 ft above the MDA (300 ft); the commander acknowledged. There was then an automated audio

Footnote

¹ These terms are used in the operator's Operations Manual to describe the role of each pilot during a flight.

² This is an approach flown without the aid of an electronic glideslope; the descent profile must therefore be managed by the pilot.

³ The MDA is the altitude below which an aircraft may not descend on an approach unless the crew has acquired the required visual reference for landing.

Footnote

⁴ This provides electronic guidance to the final approach course.

call of “CHECK HEIGHT”, an acknowledgement by the commander, and then a comment by the co-pilot to draw the commander’s attention to the airspeed. At this time the helicopter’s airspeed was 35 kt and reducing. Shortly thereafter, there was a second automated audio call of “CHECK HEIGHT”, followed by a “100 FEET” automated call two seconds before impact with the surface of the sea.

At some point the commander saw the sea, but he was unable to arrest the helicopter’s descent and it struck the surface shortly thereafter, at 1717 hrs. The co-pilot, realising that the helicopter was about to enter the water, armed the helicopter’s flotation system. After striking the surface the helicopter rapidly inverted, but remained afloat, the flotation equipment having successfully deployed.

Of the 18 occupants, 14 survived. The survivability aspects of this accident are the subject of ongoing investigation.

Standard Operating Procedures

The operator publishes its Standard Operating Procedures in the Operations Manual.

The procedure for a Non-Precision Approach, flown in conditions where the cloud base and visibility are reduced, requires the PF to fly the approach by reference to instruments. The PNF is required to monitor the approach and to look outside in order to acquire the visual reference for landing. If the visual reference is sufficient, the PNF will advise the PF and take control from him for the landing phase. If visual reference is not acquired then there is no handover of control and the missed approach profile is flown by the PF.

Aircraft information

The AS332 L2 variant of the Super Puma helicopter is a large twin-engine transport helicopter, developed as a derivative of earlier AS332 models. The fuselage is 16.5 m long, 3.4 m wide and 5 m high. The diameter of the four-bladed main rotor is 16.2 m. It is certified for a maximum seating capacity of 25, but the accident helicopter was configured with 19 passenger seats. The helicopter has a maximum takeoff mass of 9,300 kg.

G-WNSB was manufactured in 2002. The last recorded total flight hours for the airframe was 13,749 hrs.

Wreckage recovery

Witness evidence showed that the helicopter’s fuselage was largely intact following impact with the sea. It then drifted northwards onto the shoreline of Garth’s Ness headland, to the west of Sumburgh Airport. Over the ensuing hours, significant damage was caused by wave action driving the fuselage onto the rock outcrops of the cliffs along the headland. This caused the fuselage to break up and also caused damage to the engines and main rotor head/gearbox assembly which became detached from the fuselage. The rear part of the fuselage was the only section to remain on the surface, held afloat by a flotation bag; the only one of the four flotation bags that had remained inflated. This section of wreckage was towed offshore and secured to a coastguard vessel prior to recovery.

The tail section of the helicopter, containing the Combined Voice and Flight Data Recorder (CVFDR), became detached from the fuselage at some point after the impact with the sea and was found at a location further to the south of the main fuselage wreckage. The CVFDR was equipped with an Underwater Locator Beacon (ULB). The ULB was difficult to detect however, as its detection range was significantly reduced due to the physical environment.

After an extensive search, and difficult salvage operation, significant items of wreckage were successfully recovered from the seabed. These included the tail section, with the CVFDR in situ, two sections of the cockpit instrument panel, both engines and the main rotor gearbox with the main rotor head attached. A number of smaller items of floating wreckage were also recovered from the shoreline. The wreckage was transported to the AAIB's headquarters for further examination.

Wreckage examination

Despite the extensive post-impact damage caused by repeatedly striking the rocks, examination of the main rotor head and the remains of the main rotor blades revealed evidence of high-speed rotation at impact. Similar evidence was found on the tail rotor blades and the tail rotor drive shaft. The main rotor shaft was intact, as was the main rotor gearbox. The main rotor gearbox was inspected internally via access panels; no evidence of any pre-impact damage was found. The engines also showed no evidence of pre-impact damage.

The CVFDR, removed from the tail boom immediately after being recovered from the seabed, was transported to the AAIB flight recorder laboratory for the data to be downloaded. Specific items of avionics equipment, within the recovered sections of the cockpit instrument panel, were identified as containing Non-Volatile Memory (NVM). The NVM data was successfully recovered for analysis with the assistance of the BEA.

Recorded data

The recorded data was successfully downloaded from the CVFDR on the evening of 1 September 2013 after 48 hours of drying in controlled conditions. The CVFDR had recorded the most recent 78 hours of flight data and two hours of audio into a crash-protected solid-state memory. A complete record of the accident flight was available.

The CVFDR audio record consisted of the commander and co-pilot communications, radio transmissions and passenger announcements. These were recorded into two channels, and ambient sound from a cockpit area microphone (CAM) was recorded to a third channel.

Figure 1 presents the salient recorded data for the final approach to Runway 09.

Final Approach to Runway 09

The recorded data show that the approach was conducted with the autopilot in 3-axes mode. At 6.4 nm, the commander advised that he was starting the descent and, with a selected vertical speed of 500 ft/min⁵, engaged the autopilot V/S mode. The autopilot ALT.A (Altitude Acquire)⁶ mode was not used for the approach.

At 3 nm, the collective pitch was reduced and the engine torque stabilised at 18%. The airspeed was reducing at a rate of about 1 kt per second.

At approximately 2.6 nm and an altitude of 800 ft, the co-pilot advised they had 500 ft to go to the MDA, which the commander acknowledged. The airspeed was 87 kt and the descent rate was about 700 ft/min. When the airspeed reached 80 kt the collective pitch was increased, with an accompanying increase in engine torque to 24%.

At 2.2 nm, the helicopter was at an altitude of 560 ft and the airspeed was 74 kt. The helicopter's pitch attitude started to increase slowly as the autopilot maintained the selected vertical speed, whilst the airspeed continued to decrease.

Footnote

⁵ The selected vertical speed parameter is only recorded every 64 seconds.

⁶ In this mode the autopilot will level the helicopter at a pre-selected altitude.

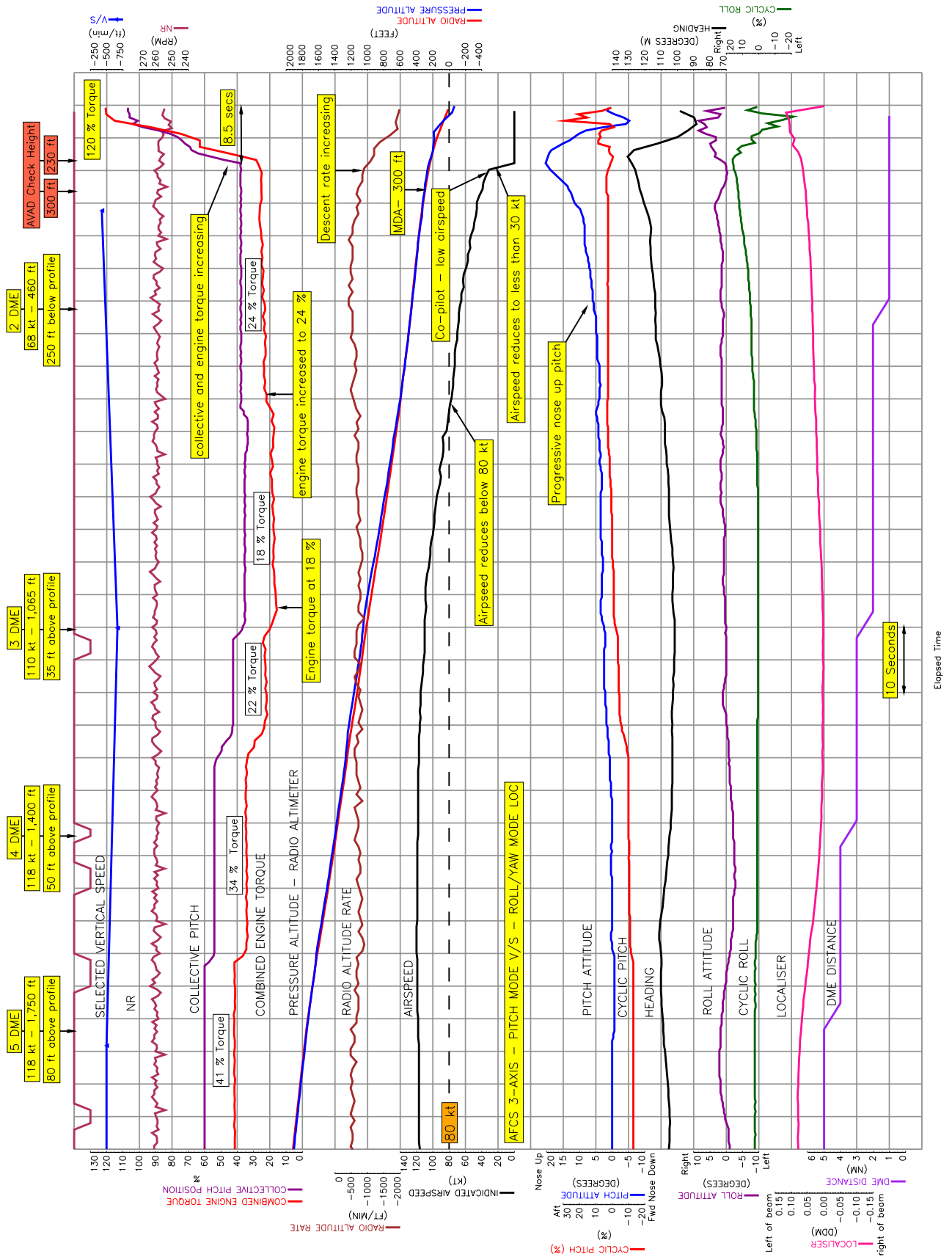


Figure 1

Recorded data parameters for the Final Approach

With the co-pilot having advised that the target altitude at 1 nm was 390 ft, the commander stated that he was reducing the rate of descent; the rate reduced from about 700 ft/min to about 500 ft/min. Several seconds later, the co-pilot advised they had 100 ft to go to their MDA and the commander acknowledged. The descent rate was being maintained at about 500 ft/min, but the airspeed had by then decreased to 54 kt and the pitch attitude was 8° nose-up with engine torque stabilised at about 24%.

The AVAD aural “CHECK HEIGHT” function activated at a height of 300 ft above the sea. The airspeed had reduced to 43 kt and the pitch attitude was now 12° nose-up. The co-pilot alerted the commander to the airspeed.

At a height of 240 ft, the helicopter’s pitch attitude was 20° nose up, the airspeed 32 kt and the rate of descent about 1,000 ft/min and increasing. There was then an increase in collective pitch and engine torque and the cyclic stick was moved forward. A second AVAD “CHECK HEIGHT” callout occurred at this time. The helicopter was at 230 ft and the airspeed had reduced to below 30 kt (airspeeds of less than 30 kt are not recorded on the CVFDR).

In response to the increase in collective pitch, engine torque increased at a rate of about 14% per second. The helicopter’s descent rate nevertheless continued to increase. As it descended through 100 ft, the AVAD 100 ft call was recorded. Engine torque was now at 115% and the descent rate was approximately 1,800 ft/min.

The helicopter impacted the surface of the sea approximately 1.5 nm from the threshold of Runway 09, yawing to the right and in an approximately level attitude. The exact rate of descent at impact is not known, but the impact was survivable.

Manufacturer’s review of recorded data

The helicopter manufacturer was provided with a copy of the recorded flight data for analysis. They concluded from their analysis that, in the last 30 minutes of flight prior to impact with the sea, the helicopter had behaved as expected based on the recorded control inputs, and no pre-impact malfunction was evident.

This initial analysis also showed that the combination of the nose-high attitude, low airspeed, high rate of descent and high power placed the helicopter in a vortex-ring state⁷ entry condition (VRS) during the final stages of the flight. The manufacturer’s modelling indicated that, in this condition, the reduced helicopter performance, together with the limited height available, meant that the impact with the sea was unavoidable.

Search and Rescue aspects

General

Numerous airborne and surface rescue assets were deployed to the accident location to search for the helicopter and rescue survivors. The first to arrive was the Maritime and Coastguard Agency (MCA) Search and Rescue (SAR) helicopter, which was on scene 26 minutes after the accident. (As a Category 1 responder under the Civil Contingencies Act, the MCA is responsible for providing the primary emergency response.)

Five of the survivors were rescued from the water. Of the 10 occupants who had boarded the two life rafts deployed from the helicopter, one did not survive.

Footnote

⁷ In this condition (also known as ‘settling with power’) the effectiveness of the main rotor is significantly reduced due to the associated airflow characteristics.

Sumburgh Airport surface rescue facilities

ICAO Annex 14 and UK Civil Aviation Publication (CAP) 168 (Aerodrome Licensing) require airport operators to make arrangements for the rescue of survivors of aircraft accidents that occur on airport approach and departure paths. Although Annex 14 does not define a specific distance, CAP 168 states that the area within 1,000 m of a runway threshold should be assessed.

There is sea beyond each end of Runway 09/27 at Sumburgh Airport. The airport is therefore required to have an appropriate resource for open water rescue to the east and west of the airport to respond effectively to incidents within 1,000 m of the runway threshold. The accident location was beyond the aerodrome response area.

The Airport Fire Service (AFS) has an 8.6-metre rigid inflatable Fast Rescue Craft (FRC) equipped to operate within the areas of sea near the runway thresholds. The FRC has to be towed on its trailer to the launch site by a suitable vehicle.

Rescue response time

There is no specified rescue response time in CAP 168; however, in order to be effective, a rescue has to occur within the time frame that a person can survive in the environment from which they require rescuing. The majority of Sumburgh Airport's passengers travel on fixed-wing aircraft and therefore do not wear survival suits. The passengers on G-WNSB were wearing survival suits, but the crew were not.

The AAIB investigation has determined that the slipway near the Runway 09 threshold is both shorter and narrower than optimum. The narrowness of the slipway requires the launch vehicle to be connected to a safety winch, adding a six minute delay. Furthermore, an

airport safety survey, conducted in 2010, indicated that the slipway could be used typically in only 11% of tidal conditions.

The nearest alternative launch site, intended for the protection of Helicopter Runway 06/24, is to the south of the airport. The Runway 09 threshold is a 4 nm sea transit from this launch site. The site is located on a soft, sand beach, which poses a risk of the FRC launch vehicle becoming bogged down.

The FRC could not be launched from the slipway near the Runway 09 threshold in response to this accident due to the unfavourable tidal conditions that prevailed. An attempt was made to use the alternate launch site, but the FRC became bogged down in the soft sand and had to be recovered. The FRC was launched from the Runway 27 slipway, requiring a 6 nm open sea transit around the peninsula to the accident location. It arrived at the accident location 58 minutes after the accident. Two of the three FRC crew members sustained injuries due to the difficult sea conditions encountered during the transit.

This accident has highlighted that, in the majority of tidal conditions, the FRC may not be able to respond to aircraft accidents in the sea on the western side of Sumburgh Airport within the available survival time.

The following Safety Recommendations are therefore made:

Safety Recommendation 2013-021

It is recommended that the operator of Sumburgh Airport, Highlands & Islands Airports Limited, provides a water rescue capability, suitable for all tidal conditions, for the area of sea to the west of Sumburgh, appropriate to the hazard and risk, for times when the weather conditions and sea state are conducive to such rescue operations.

Safety Recommendation 2013-022

It is recommended that the Civil Aviation Authority (CAA) review the risks associated with the current water rescue provision for the area of sea to the west of Sumburgh Airport and take appropriate action.

Summary

To date, the wreckage examination and analysis of the recorded data have not found any evidence of a technical fault that could have been causal to the accident, although some work remains to be completed. The ongoing AAIB investigation will focus on the operational aspects of the flight; specifically on the effectiveness

of pilot monitoring of instruments during the approach, operational procedures and the training of flight crews.

The survivability aspects of this accident will also be examined in detail.

Safety actions

The operator of G-WNSB has undertaken a review of its operational guidance on the use of automation and has further enhanced the guidance to support the full use of automation as the default, whilst allowing for the maintenance of essential degraded-mode/manual handling flying skills.

Published 18 October 2013

AAIB investigations are conducted in accordance with Annex 13 to the ICAO Convention on International Civil Aviation, EU Regulation No 996/2010 and The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.

The sole objective of the investigation of an accident or incident under these Regulations is the prevention of future accidents and incidents. It is not the purpose of such an investigation to apportion blame or liability.

Accordingly, it is inappropriate that AAIB reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

Extracts may be published without specific permission providing that the source is duly acknowledged, the material is reproduced accurately and is not used in a derogatory manner or in a misleading context.

AAIB Field Investigation reports

INCIDENT

Aircraft Type and Registration:	Boeing 737-377, G-CELS
No & Type of Engines:	2 CFM56-3B2 turbofan engines
Year of Manufacture:	1986 (Serial no: 23660)
Date & Time (UTC):	1 March 2013 at 0912 hrs
Location:	Stand 25, London Gatwick Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 6 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Minimal damage around electrical connector
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	49 years
Commander's Flying Experience:	11,701 hours (of which 3,015 were on type) Last 90 days - 98 hours Last 28 days - 15 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

During pre-flight preparations smoke was seen coming from the overhead bin over seat row 1 D, E, F. The smoke was caused by arcing across the pins of the redundant No 2 Galley electrical connector. Tests confirmed that the connector remained powered despite the No 2 Galley CB being pulled and collared. A previous inspection had identified this issue, but the operator's maintenance systems allowed the task to be closed prior to completion of the rectification work. The operator has changed the systems used to control such inspections to ensure that additional work must be completed before the inspection is closed. Any aircraft which may have been similarly affected, have been reinspected.

History of the flight

The aircraft was being prepared for a ferry flight by the crew when electrical ground power was lost. After checking the power supply, electrical power was restored and the crew continued with their preparations. Shortly afterwards the Senior Cabin Crew Member reported smoke and sparks coming from the vicinity of the overhead locker above seat row 1 D,E, F. After ordering the cabin crew to leave the aircraft, the flight crew carried out the QRH drills and declared a MAYDAY before leaving the aircraft. The AFRS attended the aircraft and confirmed that smoke and sparks had originated from an electrical connector which was positioned close to damp sound insulation material.

Investigation

An investigation carried out by the operator's engineering organisation determined that the smoke and sparks had been caused by arcing across the pins of an electrical connector previously used to provide power to the No 2 galley unit, which had been removed from the aircraft. Tests confirmed that, despite the CB for the galley unit being tripped and collared, voltage was still present at the connector pins. The connector was removed from the aircraft and the wires capped and stowed.

In 2012 a Line Maintenance Work Request (LMWR) had been raised to inspect the operator's fleet, including G-CELS, after a similar event identified the possibility of the redundant galley connector remaining powered despite the No 2 Galley CB being tripped. Analysis of the results of this LMWR showed that in the case of G-CELS, and a number of other aircraft, the LMWR had identified that the connector remained live but the system for controlling the LMWRs allowed them to be closed without confirmation that additional work identified had been completed.

Safety action

The operator carried out an additional inspection of those aircraft which the results of the previous LMWR indicated may have required additional work. One other aircraft was found to have a live No 2 Galley connector.

The operator has reviewed its procedure for the management of LMWRs and introduced new systems and procedures which will ensure that any additional work identified as a result of carrying out an LMWR is completed before the LMWR can be closed.

AAIB correspondence reports

These are reports on accidents and incidents which were not subject to a Field Investigation.

They are wholly, or largely, based on information provided by the aircraft commander in an Aircraft Accident Report Form (AARF) and in some cases additional information from other sources.

The accuracy of the information provided cannot be assured.

SERIOUS INCIDENT

Aircraft Type and Registration:	Airbus A330-243, G-OMYT
No & Type of Engines:	2 Rolls-Royce Trent 772B-60 turbofan engines
Year of Manufacture:	1999 (Serial no: 301)
Date & Time (UTC):	24 June 2013 at 1110 hrs
Location:	Manchester Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 11 Passengers - 328
Injuries:	Crew - None Passengers - None
Nature of Damage:	Contained release of HP turbine blade in right engine, with resultant damage to IP and LP turbines
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	53 years
Commander's Flying Experience:	16,600 hours (of which 7,400 were on type) Last 90 days - 154 hours Last 28 days - 73 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and AAIB enquiries

Synopsis

At approximately 105 kt on a takeoff roll on Runway 23R at Manchester, the right engine failed, emitting a flash and smoke from the exhaust. The crew quickly established that there was a loss of power and aborted the takeoff, brought the aircraft to an emergency stop on the runway and taxied clear using the unaffected left engine. Inspection of the right engine revealed there had been a failure of a single HP turbine blade which had detached, resulting in a high power engine surge and further secondary damage to the IP and LP turbines and nozzles. The blade failure was caused by high cycle fatigue (HCF)

crack propagation with crack initiation resulting from 'Type 2 Sulphidation' corrosion¹.

Footnote

¹ Type 2 Sulphidation – A high-temperature corrosion mechanism that can take place in gas turbine engines when components, in the temperature range 550 – 700°C, come into contact with sulphur or compounds containing sulphur. The source of the sulphur may be from fuel or from airborne contaminants. The compounds containing sulphur react with the component parent material, exposing the component's protective oxide layer to decay and exposing the metallic surface to attack. This can generate stress raising features that give rise to crack initiation or generate corrosion cracks, which may then propagate in fatigue.

History of the flight

The aircraft was scheduled to fly from Manchester to Punta Cana with 328 passengers and 11 crew. The co-pilot was in control and was cleared for takeoff on Runway 23R. After a normal acceleration up to approximately 105 kt the aircraft, suddenly and without warning, yawed to the right. The aircraft captain called “Stop”, took control and carried out a successful abort and emergency stop on the runway. Initially it was unclear what had taken place but an ECAM warning confirmed that a right engine failure had occurred. The emergency services were quickly in attendance and confirmed that the aircraft was safe to taxi but remained with the aircraft as a precaution.

By chance the event was observed and videoed by members of the public from a viewing area outside the airport. The videos show G-OMYT during its takeoff run and capture the right engine failure as a flash of flame and large cloud of smoke from the exhaust. This was accompanied by a bang, followed by significant shuddering of the engine pylon and nacelle.

Engine

This Airbus A330 is fitted with two Rolls Royce Trent 772B-60 triple-spool high-bypass turbofan engines. The three spools consist of low-pressure (LP), intermediate-pressure (IP) and high-pressure (HP) compressor and turbine assemblies, producing 72,000 lb of thrust. The right engine fitted to G-OMYT had completed 5,200 cycles since its last overhaul.

Engineering investigation

The engine was removed from the aircraft and it was noted that the IP and LP spools were seized. A borescope examination found that one of the HP turbine blades had detached just above its root fixing. Metallic debris collected from the runway immediately

after the incident appeared to be turbine blade aerofoil section but was misshapen, with no discernible fracture faces. The engine was moved to an overhaul facility of the manufacturer for a full disassembly and it was confirmed that a single HP turbine blade had fractured just above its root. There was damage to the IP and HP nozzles and turbines and significant amounts of debris had collected in the lower parts of the gas paths to the exhaust. In addition there was minor damage, tip bending and material loss, to the final stage of the HP compressor, with evidence of rubbing and material loss on the abradable lining. The engine structure, casings and ancillary components were intact. The fuel spray nozzles were undamaged, in a condition commensurate with the life of this engine, and tested satisfactorily.

The damage to the HP compressor can be attributed to the engine surge and HP system imbalance following the HP turbine blade loss. The damage to the IP and LP turbines and nozzles was as a result of metallic debris from the detached blade as it was carried downstream in the gas path. This in turn caused additional release of material from components as they were rotating amongst debris caught in the gas paths. The seizure of the IP and LP spools was caused by debris becoming trapped between the turbine rotors and casings as the engine ran down. The condition of the casings and the nature of the internal secondary damage show that the turbine failure was properly contained in this incident.

Laboratory analysis of the fractured blade root found multiple crack initiation locations caused by Type 2 Sulphidation corrosion. This led to high-cycle fatigue (HCF) propagation, weakening of the blade and subsequent material rupture in tensile overload. In addition, unidentified deposits were present on the surfaces of the blade remains which are the subject of ongoing analysis by the manufacturer.

SERIOUS INCIDENT

Aircraft Type and Registration:	BAe 146-300, EC-LOF	
No & Type of Engines:	4 Allied Signal ALF502R-5 turbofan engines	
Year of Manufacture:	1989 (Serial no: E3150)	
Date & Time (UTC):	19 September 2013 at 2130 hrs	
Location:	London Gatwick Airport	
Type of Flight:	Commercial Air Transport (Cargo)	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	52 years	
Commander's Flying Experience:	9,000 hours (of which 6,000 were on type) Last 90 days - 100 hours Last 28 days - 35 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

While climbing after departure from Exeter Airport, the FREIGHT DOOR UNLOCKED warning light illuminated, followed shortly afterwards by loud noises from the main cargo area. The pilots suspected that the two indications were connected and that the aircraft had suffered structural damage. The aircraft diverted to London Gatwick without further incident. The engineering investigation found two unrelated faults.

History of the flight

The aircraft was on a cargo flight from Exeter Airport to Liege Airport with two pilots on board. During the climb, as the aircraft was passing FL220, the FREIGHT DOOR UNLOCKED warning light illuminated on the Master Warning Panel. The crew completed the appropriate abnormal procedure.

Shortly afterwards, the pilots heard loud, intermittent and unidentified noises emanating from the main cargo area. Although there were no additional abnormal indications, the combination of the warning and the noise led the pilots to suspect that the aircraft may have suffered structural damage, so they declared an emergency to ATC and requested a diversion to the nearest suitable airport. ATC instructed the aircraft to divert to London Gatwick Airport and the aircraft landed there without further incident.

Throughout the incident the pressurisation system performed normally, although the unidentified noises continued until after the aircraft had landed.

Engineering investigation

An engineering investigation found that the FREIGHT DOOR UNLOCKED warning was caused by a freight door latch proximity switch being out of adjustment. The noises were probably caused by a flexible duct in the air conditioning bay becoming detached. This duct normally connects the right air-conditioning pack to a non-return valve (NRV) on the pressure bulkhead; NRV cycling or the pipe moving around in the bay may have caused the noises. There was no indication that the two faults were connected.

Analysis

The pilots were faced with two unrelated faults in succession. The freight door warning, coupled with the subsequent loud noises, led them to believe that the indications were connected and that the aircraft had suffered structural damage. The pilots, acting on this basis, carried out a successful diversion to London Gatwick Airport.

ACCIDENT

Aircraft Type and Registration:	Beechcraft BE58 Baron, G-BTFT
No & Type of Engines:	2 Continental Motors Corp IO-520-CB piston engines
Year of Manufacture:	1979 (Serial no: TH-979)
Date & Time (UTC):	2 September 2013 at 0935 hrs
Location:	Compton Abbas Airfield, Dorset
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Shock-loaded engines, propellers, flaps and landing gear doors
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	72 years
Commander's Flying Experience:	3,460 hours (of which 1,387 were on type) Last 90 days - 38 hours Last 28 days - 26 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The pilot was positioning the aircraft to Compton Abbas Airfield for maintenance. He reported that on final approach he selected the landing gear handle to the DOWN position and checked that the three green landing gear position indicator lights were illuminated. As he flared the aircraft, it sank onto the grass runway with the landing gear retracted. He was uninjured.

10 to 15 kt. The aircraft was established on a straight in approach to grass Runway 26. At a range of about 4 nm and a height of 1,500 ft AAL, the pilot selected the first stage of flap, then the landing gear handle to the DOWN position. He confirmed that the three green landing gear position indicator lights were illuminated and completed his pre-landing checklist.

History of the flight

The pilot was carrying out a positioning flight from Thruxton Aerodrome to Compton Abbas Airfield for scheduled maintenance. The weather was good, with visibility in excess of 10 km in bright sunshine, scattered cloud at 2,500 ft and a north-westerly wind of

When established on his final descent, the pilot lowered full flap. There was some light turbulence, which increased as the aircraft neared the airfield, and he adjusted the aircraft's flight path in order to touch down at the threshold of the runway. He flared the aircraft and noticed that it was sinking lower than normal. Realising

that the aircraft would contact the ground before he could initiate a go-around, he closed the throttles fully. The aircraft touched down and came to a stop with the landing gear retracted. He was uninjured.

The aircraft was recovered by an engineering organisation and lifted by crane. The landing gear motor circuit breaker was found closed and the landing gear selector handle was in the DOWN position. The inboard landing gear doors had opened and been sheared off, indicating that the lowering of the landing gear had

commenced before the landing. The landing gear was lowered without difficulty using the mechanical landing gear release mechanism. The pilot reported that he did not hear the landing gear warning horn, which was set to activate at between 1,200 and 1,500 rpm. At the time of the report, repairs to the aircraft were ongoing.

The pilot considered that, when he checked the three green landing gear position indicator lights, they had not been illuminated but appeared to be due to the bright sunlight.

ACCIDENT

Aircraft Type and Registration:	Beechcraft 58TC Baron, N6751W	
No & Type of Engines:	2 Continental Motors Corp TSIO-520 SER piston engines	
Year of Manufacture:	1980 (Serial no: TK-121)	
Date & Time (UTC):	30 July 2013 at 1315 hrs	
Location:	Panshanger Aerodrome, Hertfordshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to the landing gear, right wing and both propellers	
Commander's Licence:	FAA Airline Transport Pilot's Licence	
Commander's Age:	52 years	
Commander's Flying Experience:	2,965 hours (of which 75 were on type) Last 90 days - 104 hours Last 28 days - 31 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot reported that the cloudbase was broken at 1,000 ft, so he conducted a visual "bad weather" circuit, to land on Runway 29. As the aircraft touched down, the pilot realised it had landed both deeper into the grass runway, which was wet from recent rain, and faster than normal. After applying the brakes he "did not notice good retardation". A go-around was considered but being uncertain of its success, the pilot elected to remain on the runway.

The aircraft overran the runway and entered an adjacent field at low speed. In the process, it encountered a mound and ditch, which caused significant damage.

The pilot had considered the aircraft's landing performance, applying a factor of 1.3, and recalled that, touching down at the appropriate point on the runway, there would be about 200 metres to spare. He commented that an earlier decision to go-around would have prevented the accident.

The CAA's Safety Sense Leaflet 7c, '*Aeroplane Performance*', provides guidance on performance planning and the factors to consider for takeoffs and landings. It advises that very short wet grass on a firm soil base may be slippery, adding up to 60% to the landing distance required.

ACCIDENT

Aircraft Type and Registration:	Piper PA31-350 Navajo Chieftan, VQ-TAC
No & Type of Engines:	1 x Lycoming TIO-540-J2BD piston engine 1 x Lycoming LTIO-540-J2BD piston engine
Year of Manufacture:	(Serial no: 31-7952057)
Date & Time (UTC):	28 June 2013 at 2000 hrs
Location:	JAGS McCartney International Airport, Turks and Caicos Islands
Type of Flight:	Commercial Air Transport (Non-Revenue)
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to propeller blades and underside fuselage skin
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	49 years
Commander's Flying Experience:	12,777 hours (of which 1,181 were on type) Last 90 days - 30 hours Last 28 days - 5 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft had arrived at Providenciales when the pilot noticed that the left Main Landing Gear (MLG) oleo strut was leaking oil. After consultation with his employer, it was decided to ferry the aircraft back to its base for rectification. However, upon arrival the MLG could not be extended and a successful wheels-up landing was made. It was found that the left MLG torque link was fouling the bay interior because the oleo had not extended fully.

History of the flight

The aircraft had flown from Grand Turk to Providenciales in the Turks and Caicos Islands. Upon arrival, having shut down and vacated the aircraft, the pilot noticed

an oily substance on the left inboard flap. Inspection showed that the source of the leak was the left MLG oleo strut, so the pilot contacted his base with this information and asked for advice.

The decision was made to return to Grand Turk without passengers for further investigation and the return journey was normal until the pilot selected landing gear DOWN on the approach; only the nose landing gear indicated 'down and locked'. He discontinued the approach and climbed away to investigate, coming to the conclusion that the two MLGs were not extending. He then performed a flypast of the control tower, who confirmed that only the nose landing gear appeared to be extended.

The pilot declared an emergency and committed himself to a wheels-up landing. He raised the nose landing gear and feathered both engines on final approach, closing the firewall fuel valves and selecting fuel off. The landing was successful and there was no fire.

Subsequent examination showed that the pilot's initial suspicions following the accident were correct. Because of the leaking oleo, the left MLG leg had not

extended fully when it entered the bay and the torque link had fouled the side of it, mechanically jamming and preventing the leg from extending. The cause of the leak was traced to a twisted and broken O-ring seal on the bottom bearing which had prevented free movement of the piston.

ACCIDENT

Aircraft Type and Registration:	AS350B Ecureuil, G-JESI	
No & Type of Engines:	1 Turbomeca Arriel 1B turboshaft engine	
Year of Manufacture:	1980 (Serial no: 1205)	
Date & Time (UTC):	3 August 2013 at 2110 hrs (approx)	
Location:	Field near Fenny Drayton, Leicestershire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Aircraft destroyed by fire	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	52 years	
Commander's Flying Experience:	4,500 hours (of which 2,850 were on type) Last 90 days - 28 hours Last 28 days - 9 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and AAIB enquiries	

Synopsis

The helicopter had been airborne for approximately 25 minutes on a private flight from a private site near Milton Keynes to Manchester when the pilot became aware of an acrid burning smell in the cockpit. This was accompanied by smoke emanating from behind the lower left side of the instrument panel. Flames appeared and the smoke worsened so the pilot took immediate action to land in a field and vacate the helicopter, which was then destroyed by the subsequent fire.

History of the flight

The pilot had taken off for a routine flight from a private site near Milton Keynes to a private site in Manchester. The helicopter was being flown on autopilot and had

been airborne for approximately 25 minutes. As the pilot was referring to his tablet device, he noticed an acrid 'electrical' burning smell in the cockpit. He saw smoke coming from the lower left side of the instrument panel and drifting towards the left side of the cockpit. Believing it to be an electrical problem he spent a few seconds trying to locate the source of the smoke but then noticed a small flame behind the panel, but could not positively identify the source of the fire. He selected 'Nuneaton Disused' as a suitable diversion landing site which was shown on his GPS and the closest to his current position. He considered this to be the safest option and turned to commence an approach. The pilot selected the master switch to OFF to isolate the electrical

system but by this time the instrument panel was now on fire. He made a MAYDAY call, but was not heard as the electrical power had been isolated. Smoke was filling the cockpit so he opened the slide window which had the effect of drawing the smoke from the left side to surround him and start to affect his breathing and obscure his view of the instruments. In order to counter this he opened the cabin door and the smoke cleared enough for him to identify a suitable open field and carry out a successful landing.

On landing he immediately vacated the helicopter. The fire worsened so he moved to a safe distance away from the helicopter and called the emergency services. The fire rapidly increased and completely destroyed the aircraft.

AAIB comment

The remains of the helicopter were examined in detail by AAIB at Farnborough. It was noted that all the cabin and cockpit components had been completely destroyed in the fire. An examination of the recovered items was carried out and found the damage attributable to the post-incident fire. The few items that may have been in the vicinity of the approximate seat of the fire, as described by the pilot, were more closely examined but owing to the extensive fire damage it was not possible to establish what initiated the fire. However, given the description of the events by the pilot it is most likely to have been related to the electrical system components or wiring behind the left side of the instrument panel.

SERIOUS INCIDENT

Aircraft Type and Registration:	Champion 7ECA Citabria Aurora, G-EGWN	
No & Type of Engines:	1 Lycoming O-235-K2C piston engine	
Year of Manufacture:	2007 (Serial no: 1399-2007)	
Date & Time (UTC):	18 July 2013 at 0850 hrs	
Location:	RAF Halton, Buckinghamshire	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	58 years	
Commander's Flying Experience:	9,500 hours (of which 65 were on type) Last 90 days - 123 hours Last 28 days - 41 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The instructor reported that during an aerobatic training sortie the elevator control became restricted; a successful landing was carried out. A foreign object was later found lodged against the elevator control stop.

bounced several times with increasing amplitude, whilst pitching between the main wheels and the tailwheel, before coming to rest. The two occupants were uninjured and the aircraft did not sustain any damage.

Description of event

During an aerobatic training sortie the instructor realised that the elevator control had become restricted, making it difficult to pitch the aircraft's nose up sufficiently to maintain level flight. After assessing the remaining control authority he decided to land as soon as practical, in case the restriction became worse. An uneventful approach was flown with the student assisting with pitch control under the direction of the instructor. After touchdown, due to the elevator restriction, the aircraft

Inspection

After removing the fairing around the stern post, a red painted steel ring approximately 45 mm in diameter was found jammed in the elevator up stop, Figure 1. This limited the maximum upwards travel of the elevator to 1½ degrees below the neutral position. The origin of the ring or how it entered the aircraft could not be determined.

Discussion

The event was well handled by the experienced instructor, but slightly different circumstances could

easily have led to a catastrophic outcome. This incident serves as a valuable reminder of the potential hazards posed by loose articles in aircraft.



Figure 1

View of loose article as found after landing
(Photograph courtesy of Nigel Huxtable)

BULLETIN ADDENDUM

The following addendum was issued in the February issue of the AAIB Bulletin.

Original synopsis

The instructor reported that during an aerobatic training sortie the elevator control became restricted; a successful landing was carried out. A foreign object was later found lodged against the elevator control stop.

Additional information

The original report noted that the origin of the foreign object, a metal ring, and how it entered the aircraft

could not be determined. Further investigation by the flying club has identified that the metal ring was from the aircraft's door emergency release pull. The ring has been replaced and an additional lanyard added to restrain it should it become detached again.

ACCIDENT

Aircraft Type and Registration:	Cirrus SR22, N936CT	
No & Type of Engines:	1 Continental Motors IO-550-N piston engine	
Year of Manufacture:	2009 (Serial no: 3111)	
Date & Time (UTC):	6 June 2013 at 0947 hrs	
Location:	On approach to Gloucestershire Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Substantial damage to wings and fuselage	
Commander's Licence:	UK Private Pilot's Licence FAA Instrument rating	
Commander's Age:	76 years	
Commander's Flying Experience:	673 hours (of which 443 were on type) Last 90 days - 19 hours Last 28 days - 6 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

Synopsis

The pilot deployed the aircraft ballistic recovery system after he became disorientated on an instrument approach into Gloucester Airport. He was not injured.

pilot to climb first to 3,300 ft, then to 4,000 ft. The pilot recalls that he entered cloud shortly before flying over Oxford Airport.

History of the flight

The pilot was on a private flight from Denham Aerodrome to Gloucestershire Airport. As part of his pre-flight preparation, he had contacted Gloucestershire Airport by telephone and was informed that Runway 09 was in use.

When the aircraft was approximately 16 nm from Gloucestershire Airport, Brize ATC instructed the pilot to contact Gloster¹ but refused his request for a descent. When the pilot contacted Gloster he was offered an approach to Runway 27 which he accepted. At this stage, the pilot was approximately 7 nm from the initial approach fix which is located at 10 nm on the extended centreline.

The first part of the flight was uneventful and conducted in VMC. Initially the pilot was in contact with Farnborough ATC, who subsequently instructed him to contact Brize Norton ATC. Brize ATC instructed the

Footnote

¹ Gloucestershire Airport ATC use the voice callsign 'Gloster'.

The pilot established the aircraft on the final approach track for an RNAV approach onto Runway 27 with the autopilot engaged in GPS approach and vertical speed modes. At approximately 1,800 ft amsl the autopilot was disconnected for approximately 5 seconds, during which the aircraft rolled to approximately 30° left bank. When the pilot reinstated the autopilot, it engaged in PITCH HOLD and ROLL HOLD² modes, which are the default modes for the system. The pilot did not notice that the autopilot modes had changed and, observing that the aircraft was maintaining a banked turn, attempted to override the autopilot to regain a wings level attitude. After a further 18 seconds, the pilot disconnected the autopilot for a second time but the aircraft had now deviated from the approach centreline. The pilot stated that while trying to correct the situation he “over-controlled” the aircraft in roll and subsequently in pitch. During the following 80 seconds, the aircraft exhibited large variations of pitch, roll, speed and altitude as the pilot attempted to bring the aircraft under control. A series of warnings occurred including an overspeed and terrain proximity warning, and the pilot observed a large red ‘V’ on the primary flight display (PFD)³. At this point the aircraft was still in cloud and, assessing that he was too close to the ground to recover from what he described as an out-of-control situation, he decided to deploy the ballistic recovery system. The pilot reported that he only became VMC at about the same time as the parachute deployed.

The aircraft came to rest in the garden of a suburban house and was substantially damaged; the pilot was uninjured.

Footnote

² The aircraft was fitted with a Cirrus Perspective system. In these modes the autopilot will try, within certain limits, to maintain the pitch and roll attitude at the time of engagement.

³ When the aircraft enters an unusual pitch attitude, red extreme pitch warning chevrons pointing toward the horizon are displayed on the Attitude Indicator, starting at 50° above and 30° below the horizon line.

The pilot stated that the combination of the unexpected runway change and the delay in being allowed to descend to the required height to commence the approach resulted in him experiencing high workload and stress.

Automatic flight control system (AFCS)

The AFCS has four main operating functions: autopilot, flight director, yaw damper and electric pitch trim. The autopilot controls the aircraft pitch and roll attitudes using flight control surface servos following commands received from the flight director based on the active modes. The servo mounts are equipped with slip-clutches set to certain values and this allows the pilot to override the servos.

The autopilot also has an automatic levelling function activated by pressing the LVL key on the AFCS control panel. Pressing the LVL key engages the autopilot (if the autopilot is disengaged and the aircraft is within the autopilot engagement limitations⁴) and the aircraft is commanded to fly to zero bank angle and zero vertical speed. When the LVL key is pressed, all armed and active autopilot modes are cancelled and the autopilot and flight director revert to LVL mode for pitch and roll. Activation of the stall warning system at any stage of flight will disconnect the autopilot including the LVL mode if engaged.

Ballistic recovery system

The ballistic recovery system (BRS) consists of a parachute, a solid fuel rocket to deploy the parachute, an activation handle and a harness imbedded within the fuselage structure. A three-point harness connects the aircraft fuselage structure to the parachute. The pilot can activate the system by pulling the handle located on the cockpit ceiling. This deploys the rocket out of a

Footnote

⁴ The autopilot engagement limits are ±30° in pitch ±75° in roll.

hatch on the top of the aircraft behind the cockpit. The rocket pulls the parachute from the hatch, the embedded forward harness straps pull through the fuselage skin and the aircraft will then descend in a more or less level attitude.

Weather

The 0950 hrs weather report from Gloucestershire Airport indicated surface wind from 040° at 8 kt, visibility 8,000 m, scattered cloud at 500 ft, broken cloud at 800 ft, temperature 11°C, dewpoint 8°C and pressure 1023 hPa.

Pilot training

The pilot had received training in a Cirrus simulator during which he practised using the BRS in response to various emergencies. The pilot stated that this training was beneficial in dealing with the situation he faced. He had not received any training involving the use of the LVL function.

Recorded data

The aircraft was fitted with a Cirrus Perspective avionic system, based on the Garmin G1000 system. The system had an SD card installed which enabled the collection of flight data that would otherwise be lost. The aircraft was also fitted with a Recoverable Data Module (RDM), which would not download. The data from the display system was analysed and is shown in Figure 1.

At 0942 hrs the aircraft was at 2,000 ft amsl flying to Gloucestershire airport from the east on a heading of 269°M, with an IAS of 84 kt. The AFCS was engaged and in the GPS roll mode and ALT pitch mode. The AFCS pitch mode was changed to vs as the aircraft started to descend. At 0942:57 hrs, the AFCS was manually disconnected as indicated by the recorded AFCS status value of 5, which is linked to a flashing caption on the

display. At 0943:05 hrs the AFCS was recorded as ON again, with the default pitch and roll modes of PITCH HOLD and ROLL HOLD; the aircraft was pitched down 9.4° and had 23.4° of left roll at this time so these values were set by the AFCS as the commanded pitch and roll values.

At 0943:23 the AFCS was manually disconnected again and levelled at approximately 1,400 ft amsl with a relatively stable speed, neutral pitch but not a stable roll or heading. At 0943:40 hrs a right roll was initiated that reached 81.9°, with a commensurate rapid descent and speed increase, until the aircraft levelled at 1,000 ft amsl, heading for the airfield. The aircraft then climbed at a rate that peaked at 2,988 ft/min until it reached 1,771 ft amsl with a speed that had reduced to 54.6 kt. At this point the aircraft rapidly rolled left and the nose dropped. The descent stopped at 880 ft amsl, with an IAS of 144 kt after having exceeded 10,000 ft/min. The cycle of a high pitch climb, reduction in airspeed and accelerating descent was then repeated until the recording stopped in the descent as a result of the BRS being deployed.

Analysis

When the pilot commenced the approach, the aircraft was being flown with the autopilot engaged in approach and vertical speed mode. When the pilot reengaged the autopilot after the first disconnection, the autopilot engaged in default modes of PITCH HOLD and ROLL HOLD. However, probably due to the high workload he was experiencing, the pilot did not notice that the autopilot was now operating in different modes from before. The pilot expected the aircraft to continue on the approach centreline and, when he noticed that the aircraft was maintaining a left bank, he overrode the autopilot in an attempt to level the aircraft. As the autopilot was still engaged, every time the pilot relaxed on the controls the aircraft tried to regain the roll attitude

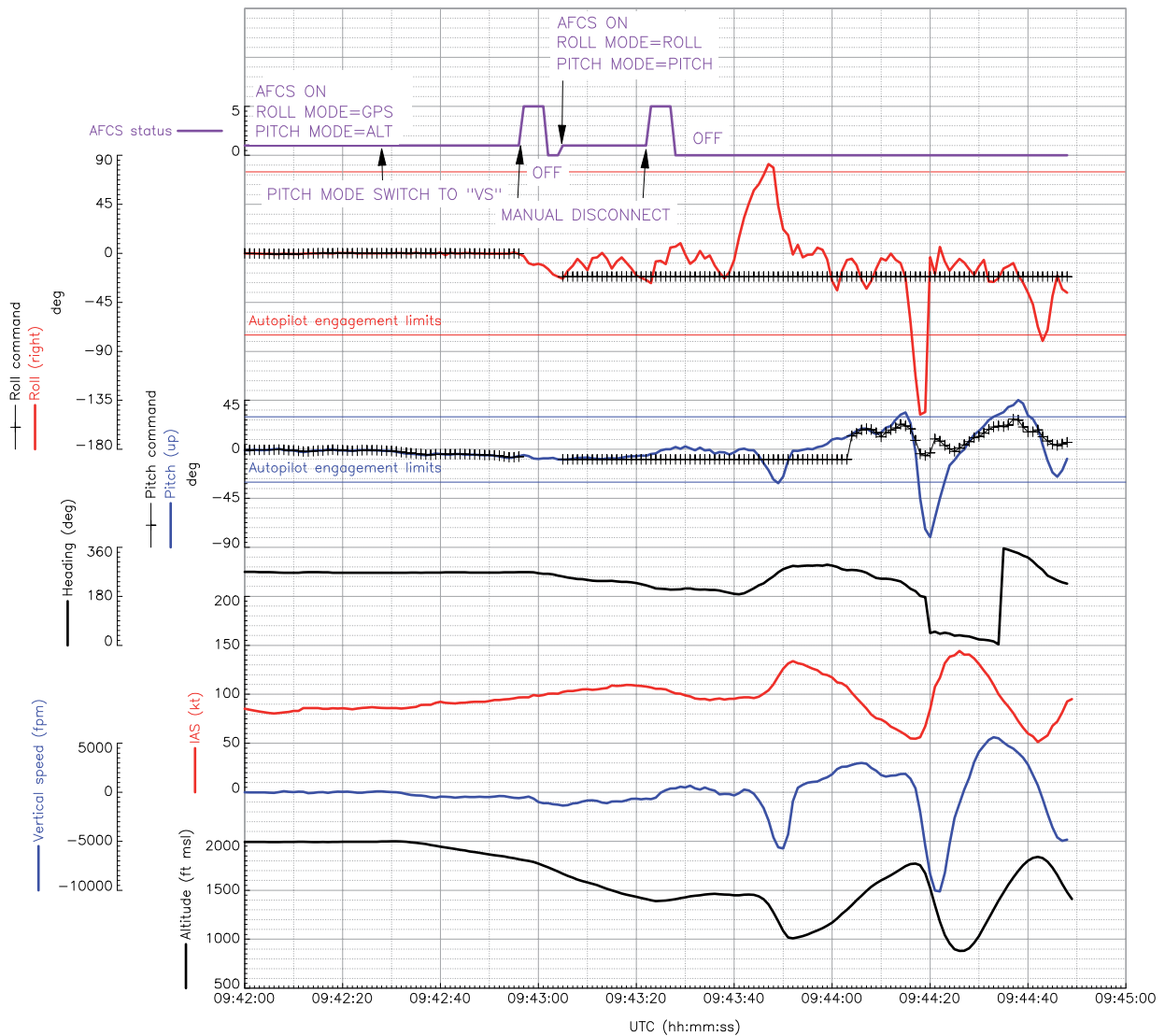
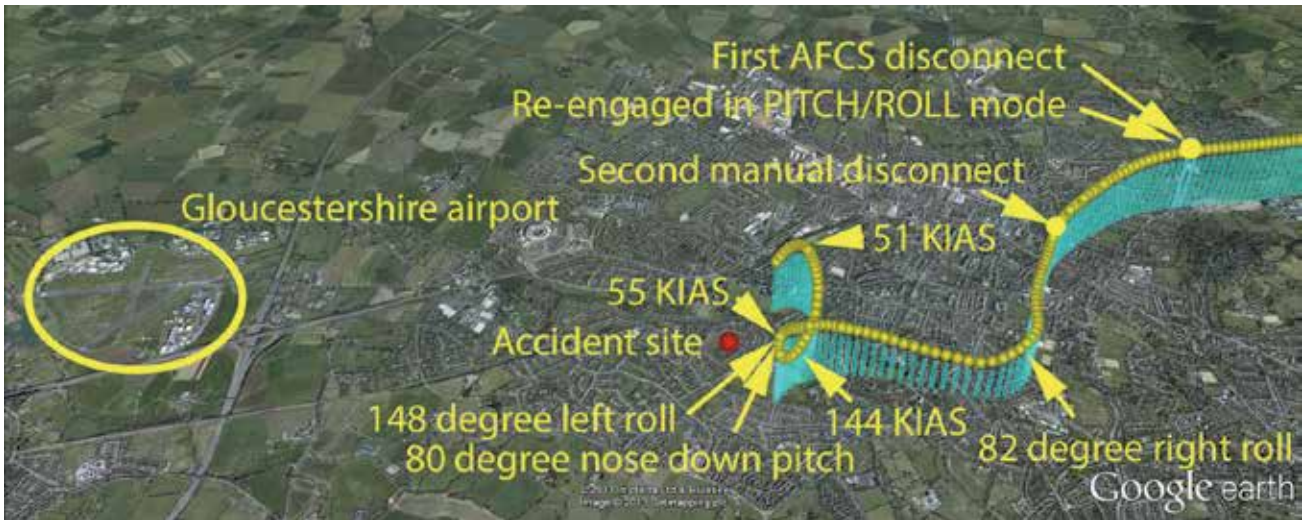


Figure 1

Data recovered from the display

that existed at the time of engagement. This unfamiliar aircraft behaviour led to a series of roll oscillations as the pilot intermittently overrode the autopilot. After approximately 18 seconds, the pilot again disconnected the autopilot but the aircraft was displaced left of the approach centreline. By this stage, the pilot was confused and distracted by the unexpected aircraft behaviour and, in his attempts to regain the approach path, he started over-controlling in roll and then in pitch. The variations of pitch, roll, height and airspeed increased to the extent that he became disorientated and, when he assessed that he could not safely regain control, he operated the BRS. The training the pilot had received in the use of the BRS assisted him in deciding to use, and actually deploying, the system. Although the pilot did not activate the automatic levelling system, once the

flight path deviations commenced, at times the aircraft was outside the autopilot engagement limits and, under these circumstances, the LVL mode could not have been engaged.

Conclusion

The initial disengagement and re-engagement of the autopilot caused the system to engage in default modes that the pilot was not expecting and, due to high workload, did not notice. The distraction and confusion caused by the unexpected aircraft response caused him to over-control in pitch and roll which further increased workload and led to him becoming disorientated to the extent that he felt he was unable to control the aircraft safely.

ACCIDENT

Aircraft Type and Registration:	DH60G Gipsy Moth, G-AAZG	
No & Type of Engines:	1 De Havilland Gipsy 1 piston engine	
Year of Manufacture:	1930 (Serial no: 1253)	
Date & Time (UTC):	12 August 2013 at 1030 hrs	
Location:	Canons Ashby, Daventry, Northamptonshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - 1 (Serious)	Passengers - 1 (Serious)
Nature of Damage:	Substantial damage to the landing gear, fuselage and wings	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	39 years	
Commander's Flying Experience:	512 hours (of which 15 were on type) Last 90 days - 14 hours Last 28 days - 3 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The aircraft was performing a steep turn to the left when the engine stopped. It entered a spin and, whilst the pilot was able to recover from the spin, during the subsequent forced landing the aircraft struck a grass bank and was extensively damaged. Both occupants were seriously injured.

History of the flight

The pilot was carrying out a local flight with a friend. The weather was good (CAVOK), with a westerly wind of about 12 to 15 kt. The passenger occupied the front cockpit and the pilot the rear. The engine started normally and the aircraft departed, climbing to an altitude of 1,200 ft.

The pilot carried out two medium banked turns and a gentle wingover manoeuvre before entering another steep turn to the left. When established in the turn, the engine stopped and the aircraft entered a spin to the left. The pilot recovered from the spin but, due to the limited height available, could only pull out of the dive and carry out a forced landing in an isolated grass area, amongst trees and other obstacles. In doing so, the aircraft struck a ridge and furrow, which destroyed the landing gear and much of the forward fuselage. A member of the public witnessed the accident and called the emergency services, who recovered both occupants from the wreckage. The pilot and his passenger had suffered serious injuries and were transferred to hospital. There was no fire.

The aircraft had recently been re-weighed. During that process, the fuel tank had been drained and the same fuel was then used to refill the tank. After that, the aircraft had flown some five hours, during which it had been refuelled twice at a licensed aerodrome. The second refuel had taken place prior to positioning the aircraft back to the private site from which the accident flight departed. It was reported that the engine had been consistently reliable. No reason for the engine failure was identified.

The pilot considered that he had avoided a serious head injury because he was wearing a protective helmet. Also, he commented that he had since had discussions with others in the historic aircraft community regarding energy absorbing foam in seat pans and its potential for reducing the level of back injuries in the event of an accident.

ACCIDENT

Aircraft Type and Registration:	Gardan GY80-160 Horizon, G-ASZS	
No & Type of Engines:	1 Lycoming O-320-B3B piston engine	
Year of Manufacture:	1965 (Serial no: 70)	
Date & Time (UTC):	14 August 2013 at 1245 hrs	
Location:	Leicester Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Propeller, shock-loaded engine, front cowling, scoops and aeriels under fuselage, lower wing skins	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	56 years	
Commander's Flying Experience:	500 hours (of which 299 were on type) Last 90 days - 3 hours Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot was flying from Wellesbourne Airfield to Leicester Airport in good weather with a light wind. He had received prior permission from Leicester Airport indicating Runway 28 in use, which had a Landing Distance Available (LDA) of 935 m. Upon arrival in the circuit, he was advised that Runway 22 was in use which is considerably shorter with an LDA of 490 m. Realising this difference, the pilot reported that landing "would be a real challenge". He reported that concentrating on the approach then caused him to forget the downwind checks. These included checking that the landing gear and flaps were extended.

The aircraft touched down on Runway 22 with the landing gear and flaps up and slid to a halt in a ploughed field at the end of the runway. The pilot, who was wearing a lap and diagonal harness, was uninjured. He indicated that the landing gear warning horn (which is designed to operate when the gear is up and engine rpm is less than 1,700 rpm) failed to operate, probably due to a tripped circuit breaker.

ACCIDENT

Aircraft Type and Registration:	Lancair 320, G-PJMT	
No & Type of Engines:	1 Lycoming IO-320-D1B piston engine	
Year of Manufacture:	1998 (Serial no: PFA 191-12348)	
Date & Time (UTC):	9 June 2013 at 1412 hrs	
Location:	Exeter Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to main landing gear, left aileron, left flap and rudder	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	71 years	
Commander's Flying Experience:	Approx 25,000 hours (of which 440 were on type) Last 90 days - 16 hours Last 28 days - 12 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The left main landing gear leg collapsed after a normal landing. The upper attachment point for the left main gear over-centre link had failed and further investigation on this part is being carried out by the Light Aircraft Association.

History of the flight

The aircraft touched down normally at Exeter and the pilot allowed the aircraft to decelerate without applying the brakes. He then discovered that he needed full right rudder and steady right brake to keep the aircraft tracking straight. Eventually it was apparent that the aircraft would depart the left side of the runway so he selected the mixture to 'idle cutoff' and switched off the

ignition. The aircraft came to rest in long grass about 10 to 15 m from the runway's edge. The pilot completed his shutdown checks and vacated the aircraft with his passenger.

Aircraft examination

The aircraft had come to rest on its left wing with its left main gear collapsed and the right gear partially collapsed. The nose gear extension was normal. Scrape marks on the runway and on the base of the rudder and under the left brake unit revealed that the left main landing gear leg had collapsed before the aircraft ran onto the grass. The left main gear over-centre link had failed at its upper attachment point and this part was

sent to the Light Aircraft Association (LAA) for further examination.

The LAA has stated that the failure appeared to have originated from a drilling designed to hold a microswitch-operating roll pin. The part was different

from the design drawing in that it was fitted with a male rod end bearing, while the drawing shows a female rod end bearing – this would have affected the part's fore/aft strength. The LAA is investigating this failure with the assistance of the aircraft kit manufacturer.

ACCIDENT

Aircraft Type and Registration:	Morane Saulnier MS.893A Rallye Commodore 180, G-AVVJ
No & Type of Engines:	1 Lycoming O-360-A2A piston engine
Year of Manufacture:	1967 (Serial no: 10752)
Date & Time (UTC):	17 August 2013 at 1100 hrs
Location:	Felthorpe Airfield, Norfolk
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Minor) Passengers - N/A
Nature of Damage:	Aircraft damaged beyond economic repair
Commander's Licence:	Private Pilot's Licence
Commander's Age:	74 years
Commander's Flying Experience:	611 hours (of which 180 were on type) Last 90 days - 4 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

After an uneventful flight around north Norfolk, the pilot was returning to Felthorpe Airfield. He set up an approach to Runway 23; the wind was from 260° at 20 kt. At approximately 500 yds from the threshold the approach was normal, at a speed of 70 kt and with full flap selected.

Speed was reduced to 65 kt 'over the hedge' but at this point, a gust of wind lifted the right wing and the left wing contacted the first of a line of trees running from

close to the runway threshold in a southerly direction. The contact with the tree caused the aircraft to yaw left and, despite the fact that the pilot tried to counter the swing, his low airspeed meant that he could not prevent the aircraft from entering the tree line again. Here it came to a halt, hanging nose-down from the fourth tree and supported by its left wingtip on the ground; the engine had also detached. The pilot was uninjured and evacuated through the broken windscreen.

ACCIDENT

Aircraft Type and Registration:	Piper PA-28-140 Cherokee, G-DIAT	
No & Type of Engines:	1 Lycoming O-320-E2A piston engine	
Year of Manufacture:	1974 (Serial no: 28-7425322)	
Date & Time (UTC):	30 August 2013 at 1255 hrs	
Location:	Sandtoft Airfield, Lincolnshire	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to the nose landing gear and propeller	
Commander's Licence:	Student pilot	
Commander's Age:	43 years	
Commander's Flying Experience:	71 hours (of which 50 were on type) Last 90 days - 21 hours Last 28 days - 20 hours	
Information Source:	Aircraft Accident Report Forms submitted by the student pilot and his flying instructor	

Synopsis

The aircraft was being landed by a student pilot at the end of a solo navigation exercise. The aircraft "ballooned" in the flare and was seen to oscillate in pitch, bouncing two or three times. The nosewheel detached from the aircraft, which came to a stop on the runway. The student pilot was uninjured.

History of the flight

The student pilot was landing the aircraft at the end of a solo cross-country navigation training exercise. Runway 23 was in use and the weather was fine with a surface wind of 15 kt from 230°.

The student pilot reported that he flew the final approach at 70 kt to the point of flare, at which point he closed the

throttle. He felt that a gust of wind caught the aircraft, causing it to "balloon". The aircraft then touched down in an approximately normal attitude before bouncing and becoming airborne again. The second touchdown was in a flatter attitude, such that the nosewheel was subject to a harder landing force than usual. The student did not think it excessive, and did not think that the second touchdown was on the nosewheel first, but the nosewheel detached at this point.

The student pilot applied aft control column in an attempt to keep weight of the nose leg. The aircraft subsequently came to a stop on the asphalt runway. The Airfield Fire Service attended the scene but the pilot, who was uninjured, was able to vacate the aircraft normally.

The student's flying instructor also submitted a report, in which he commented that the student had completed eight good landings prior to the accident. The accident was witnessed by another club instructor who reported that the aircraft's approach had appeared higher and faster than normal, leading to a "balloon" at the point of

flare. The aircraft then pitched nose-down in an apparent attempt by the student to land the aircraft, before entering a series of pitch oscillations and bounces. On the third bounce the nosewheel detached, and the aircraft came to a stop on the runway.

INCIDENT

Aircraft Type and Registration:	Piper PA-28-161 Cherokee Warrior II, G-BSVG	
No & Type of Engines:	1 Lycoming O-320-D3G piston engine	
Year of Manufacture:	1984 (Serial no: 28-8516013)	
Date & Time (UTC):	4 September 2013 at 1230 hrs	
Location:	Perranporth Airfield, Cornwall	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Left wingtip dented	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	45 years	
Commander's Flying Experience:	131 hours (of which 131 were on type) Last 90 days - 52 hours Last 28 days - 14 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Piper PA-28 G-BSVG had just landed at Perranporth Airfield and was taxiing along the perimeter track past the hangar when its left wingtip struck the left wingtip of a parked Rockwell Commander (G-BYKB). On impact G-BSVG rotated to the left through approximately 45° and came to a stop. Both aircraft sustained wingtip damage. G-BSVG was shut down and its occupants vacated the aircraft uninjured. The parked aircraft was

unoccupied, attached to a ground handling tug and was the only aircraft parked outside the hangar that day. The pilot commented that he considered himself to have been distracted, whilst taxiing, by making a radio call and looking ahead to locate the airfield fuel point. As a result he and his passenger did not notice the close proximity of G-BYKB.

ACCIDENT

Aircraft Type and Registration:	Reims Cessna FRA150M Aerobat, G-BFGZ	
No & Type of Engines:	1 Continental Motors Corp O-240-E piston engine	
Year of Manufacture:	1977 (Serial no: 329)	
Date & Time (UTC):	26 July 2013 at 1312 hrs	
Location:	Old Buckenham Airfield, Norfolk	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to propeller, nose gear and possible shock-load on the engine	
Commander's Licence:	Student	
Commander's Age:	55 years	
Commander's Flying Experience:	40 hours (of which 10 were on type) Last 90 days - 2 hours Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The student completed two circuits with an instructor then flew solo. During the second landing the aircraft bounced and as it touched down again the nose gear leg collapsed.

ACCIDENT

Aircraft Type and Registration:	Socata TB20 Trinidad, G-TBXX	
No & Type of Engines:	1 Lycoming IO-540-C4D5D piston engine	
Year of Manufacture:	1982 (Serial no: 276)	
Date & Time (UTC):	7 July 2013 at 1625 hrs	
Location:	Headcorn Aerodrome, Kent	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 2
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to left landing gear, pilot step and left wingtip	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	39 years	
Commander's Flying Experience:	435 hours (of which 267 were on type) Last 90 days - 14 hours Last 28 days - 5 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The left main landing gear leg failed at low speed during the landing roll. There were no injuries.

History of the flight

The accident occurred on the last of three flights flown that day, all flown by the same pilot, who reported the earlier flights as having been uneventful. Prior to the accident flight the pilot carried out a pre-flight inspection, with particular emphasis on the retractable landing gear, as was his normal practice. Nothing abnormal was found.

Following a 50-minute local flight, the pilot carried out a normal landing on the grass Runway 10 at Headcorn. The wind was from 050° at 7 kt. The approach was stable and flown at 80 kt, with full flap. The landing gear was

confirmed down before landing by the presence of three green indicator lights. Touchdown was normal, and the aircraft was allowed to decelerate initially without wheel brakes. Later in the landing roll, the pilot selected the wing flaps up and was about to apply wheel brakes when the left wing began to sink as the left landing gear collapsed. The aircraft slid for a few metres and veered left before coming to a stop, still on the runway. The collapse had occurred at low speed and was fairly gradual; none of the occupants were injured and after the pilot shut down the engine they vacated through the left cabin door.

Further actions

The aircraft was inspected by a local maintenance organisation who reported that the leg had failed

approximately 3 inches below its top attachment. The engineer who conducted the inspection commented that evidence of corrosion was visible on the inner surface of the leg and he thought this may have led to the

development of a crack from the inside outwards. He added that the area was difficult to inspect visually in situ. A Mandatory Occurrence Report (MOR) highlighting his findings was submitted to the CAA.

ACCIDENT

Aircraft Type and Registration:	Yak C.11, G-BTZE	
No & Type of Engines:	1 Ash/M 21 piston engine	
Year of Manufacture:	1955 (Serial no: 171312)	
Date & Time (UTC):	11 August 2013 at 1153 hrs	
Location:	Wycombe Air Park, Buckinghamshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to the left wing tip and propeller	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	45 years	
Commander's Flying Experience:	1,192 hours (of which n/k were on type) Last 90 days - 43 hours Last 28 days - 17 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

Whilst taxiing, the left main landing gear retracted which resulted in damage to the left wingtip and the propeller. The pilot stated that the incident was caused by the inadvertent selection of the landing gear to UP, instead

of DOWN, during the pre-flight checks. He attributed this action to a number of distractions and interruptions which had occurred during the preparation for the flight.

ACCIDENT

Aircraft Type and Registration:	Zenair CH 250 Zenith, G-RAYS
No & Type of Engines:	1 Lycoming O-320-B2C piston engine
Year of Manufacture:	2006 (Serial no: PFA 113-10460)
Date & Time (UTC):	19 August 2013 at 1112 hrs
Location:	Skegness Airfield, Lincolnshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - 1 (Minor)
Nature of Damage:	Damage to wings, propeller, landing gear and canopy
Commander's Licence:	Private Pilot's Licence
Commander's Age:	66 years
Commander's Flying Experience:	168 hours (of which 45 were on type) Last 90 days - 5 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The pilot arrived at Skegness Airfield and flew a circuit to check the windsock. He saw that the wind was at 90° to Runway 03, but he had previously decided that Runway 29, which was into wind, was too short for his aircraft so he decided to make an approach on the former. This was done successfully, the pilot experiencing a slight bump on touchdown, following which he eased back on the power and control column, a technique which he described as normal for this type of aircraft.

Suddenly there was a second, more solid bump and bounce and the aircraft rose several feet into the air with the nose slightly raised. At this point, the pilot decided to go around and applied power but the aircraft, veered sharply left toward a hedge and line of trees running parallel to the runway. It struck these and came to a halt before the pilot could correct the heading. He states that he believes he was startled by the unexpected bounce and may have been too slow to react.

ACCIDENT

Aircraft Type and Registration:	Zenair CH 601HD Zodiac, G-BVAC	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	1995 (Serial no: PFA 162-12504)	
Date & Time (UTC):	22 August 2013 at 1724 hrs	
Location:	Gloucestershire Airport	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to propeller, nosewheel, cowling and right main landing gear	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	48 years	
Commander's Flying Experience:	587 hours (of which 217 were on type) Last 90 days - 11 hours Last 28 days - 7 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Summary

During takeoff, the cockpit canopy became unlatched and started to lift. The pilot grabbed the canopy pull cord to prevent it lifting further, but the aircraft entered a shallow dive, resulting in the nose and right hand landing gears striking the runway. The nose gear collapsed and the propeller disintegrated after striking the ground.

History of the flight

The pilot and his passenger had planned to conduct a short flight to Oaksey Park. All the pre-flight preparations proceeded normally; the pilot briefed the passenger on the evacuation procedure and, after being given clearance from Gloucester Tower, lined up and took off on Runway 18. Immediately after becoming

airborne, the pilot levelled the aircraft to allow it to accelerate in ground effect. However, it then became apparent that the front-hinged canopy had become unlatched and was starting to lift. The pilot transferred his left hand from the throttle to the control column and grabbed the canopy pull cord with his right hand in an attempt to prevent the canopy from lifting further. He then looked towards his passenger and asked him to hold onto the cord. This diverted the pilot's attention such that the aircraft entered a shallow dive and struck the runway on the nose and right hand landing gears. The nose landing gear collapsed, allowing the propeller to strike the runway surface and disintegrate. The aircraft slid to a halt, the engine still running at full throttle, some

50 to 100 m further along the runway. The pilot shut the engine down, transmitted a MAYDAY call and, with his passenger, evacuated the aircraft.

Discussion

Some examples of this type of aircraft are equipped with side-opening canopies. However G-BVAC's canopy was forward opening and supported by two struts mounted either side of the fuselage towards the front of the cockpit. These effectively functioned as a hinge and allowed the canopy to be opened by lifting from the rear. Gas struts were fitted, which enabled the canopy to be propped in the open position. Handles on either side of the cockpit operated a latch mechanism that locked the canopy in the closed position. There

was also a 'half latch' position that partially lifted the canopy so as to provide ventilation when the aircraft was on the ground, including taxiing.

The pilot subsequently stated that he may have left the canopy in the 'half latch' position prior to take off. In his attempts to deal with the lifting canopy, both hands were fully occupied and he was unable to close the throttle immediately. He was reluctant to release his hold on the canopy cord as he was aware of anecdotal reports that the aircraft would not fly with the canopy released. [Note: whilst there does not appear to be any documented record of test flights in this configuration, pilot experience suggests that although the aircraft is controllable, it will not maintain height.]

ACCIDENT

Aircraft Type and Registration:	Christen A-1 Husky, G-WATR	
No & Type of Engines:	1 Lycoming O-360-C1G piston engine	
Year of Manufacture:	1988 (Serial no: 1040)	
Date & Time (UTC):	7 August 2013 at 1619 hrs	
Location:	Loch Awe, Argyll and Bute	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to cowlings, forward fuselage, floats, landing gear and wings. Other damage as a result of water immersion	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	42 years	
Commander's Flying Experience:	407 hours (of which 99 were on type) Last 90 days - 99 hours Last 28 days - 48 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

Synopsis

This tandem-seat, amphibian aircraft was being used to train a pilot prior to the renewal of his Single-Engine Piston (SEP) (Land) rating. During the flight and with the landing gear extended, an engine failure was simulated when overhead Loch Awe. The instructor told the student to imagine a landing strip on the surface of the loch and to aim for that. The student expected to be told when to climb away but instead the instructor invited him to continue and land. The landing gear remained extended and this caused the aircraft to flip onto its back when water contact was made. Both pilots escaped without injury.

History of the flight

The aircraft was being used to train a pilot in preparation for the renewal of his Single-Engine Piston (SEP) (Land) rating. The flight commenced with a water takeoff from Loch Earn. This was coached by the instructor, as the student had some previous experience of water takeoffs and landings. From Loch Earn they flew to Oban Aerodrome where they refuelled, before conducting a series of circuits to the asphalt runway. Three touch-and-go landings and one practice engine failure exercise were completed before they headed to the east for upper airwork. Once at an appropriate altitude, the student practised some stall recoveries, both with the landing gear extended and with the landing gear

retracted. By this time the aircraft was in the vicinity of Loch Awe and was at 2,500 ft amsl. Prior to the flight, the instructor had discussed the actions to be employed if an engine failed, and he now initiated a Practice Forced Landing (PFL). The terrain around the loch was heavily wooded and inhospitable, so the instructor suggested that they imagine an airstrip on a stretch of water parallel to the western shore, and the student used this as his aiming point. The landing gear was extended and both pilots initially anticipated that they would discontinue the approach and climb away from a height of around 500 ft, but the instructor changed his mind and decided they could continue for a water landing. When he was not told to climb away, the student queried the intention and was told that he should continue and land at the aiming point.

The rear wheels and floats made water contact first and the aircraft started to decelerate rapidly. Once the front wheels touched the water, the aircraft started to pitch onto its nose. This could not be controlled and it ended up inverted, with the front of the floats submerged and the tail clear of the water. The pilots said that the rotation did not feel particularly violent and neither of them was injured. They reported that their five-point harnesses released easily and that they were able to open the door and egress without difficulty. At this stage, there was still buoyancy in the wings and the student was able to climb onto a wing, without getting wet, and phone for assistance. Two local fishing boats came to their aid. Although the aircraft settled in the water, with only the floats and wheels visible, a boat was able to tow it to a suitable beach for recovery.

Discussion

In the Husky, the landing gear indications are presented on the left side of the instrument panel. With the landing gear up, four blue lights indicate the correct configuration

for a water landing, while four green lights indicate landing gear down, for land operations. In addition to this, there is an aural alert with an associated flashing annunciator. On decelerating to less than 65 kt, a male voice declares "GEAR DOWN FOR RUNWAY LANDING" or, alternatively, a female voice declares "GEAR UP FOR WATER LANDING". The alerts continue until the annunciator is pressed. From the rear seat the instructor can hear the aural alerts, but has to look over the student's left shoulder to see the indications. During this PFL the landing gear was down throughout. As far as the student was concerned, this was the correct configuration for an approach to an airstrip, albeit a simulated one. He did not recall pressing the annunciator to cancel an aural message and commented that the annunciator may have failed because of a possible loose connection. In the circumstances, he understood the landing gear to be in the correct position.

The instructor did not remember hearing an aural message and did not visually check the landing gear lights after he made the decision that they would land on the water. He acknowledged that he had caused confusion by suggesting that they use a stretch of water as an imaginary airstrip. The aircraft's checklist for an emergency landing on water specifies that the landing gear must be 'UP'. For emergency landings on land, the checklist specifies landing gear 'DOWN' for smooth terrain but 'UP' for rough terrain.

This Christen A-1 Husky is one of a handful of amphibian aircraft that operate in the UK. Although the accident that occurred on Loch Awe could only have happened to this class of aircraft, it does highlight how confusion can be caused within the training environment.

The incorrect selection of landing gear is usually associated with 'gear-up' arrivals on land. This subject

is explored in a video that has recently been promulgated on the website of the European General Aviation Safety Team (EGAST), which is part of the European Strategic

Safety Initiative (ESSI). This video along with a growing number of safety leaflets can be viewed at: <http://www.easa.europa.eu/essi/egast/> .

ACCIDENT

Aircraft Type and Registration:	EV-97 TeamEurostar UK, G-CEFZ	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	2006 (Serial no: 2824)	
Date & Time (UTC):	26 August 2013 at 1143 hrs	
Location:	Cotswold Airport, Gloucestershire	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to nose landing gear, propeller and forward fuselage	
Commander's Licence:	Student	
Commander's Age:	54 years	
Commander's Flying Experience:	60 hours (of which 59 were on type) Last 90 days - 14 hours Last 28 days - 3 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Following a number of successful circuits with his instructor, the solo student, who had a total of 1 hour 45 minutes as PIC, was carrying out a touch-and-go landing on Runway 08. The surface wind was reported as being from 040° at 9 kt. The student reported that all went well during the flare until the aircraft “suddenly

dropped” on to the runway. It then bounced and was seen to develop an oscillation in pitch, resulting in a nosewheel first touchdown and the subsequent collapse of the nose landing gear. The aircraft came to a halt on the runway and the pilot, who was uninjured, was able to vacate it unaided.

ACCIDENT

Aircraft Type and Registration:	Ikarus C42, PH-3L3	
No & Type of Engines:	1 x Rotax 912UL piston engine	
Year of Manufacture:	2001	
Date & Time (UTC):	17 July 2013 at 1700 hrs	
Location:	Bellarena Airfield, County Londonderry	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Stub axle sheared, nosewheel fork bent	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	30 years	
Commander's Flying Experience:	64 hours (of which 64 were on type) Last 90 days - 21 hours Last 28 days - 6 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot was flying from Carrickmore, County Tyrone, to Bellarena Airfield. At the time the weather was good and the wind was varying between 190° and 170° at 12 kt. During the final part of the approach to Runway 30 the aircraft experienced some sink which the pilot arrested with power. After the aircraft crossed a 4 ft wall in the undershoot of the runway the pilot closed the

throttle and initiated a flare at about 3 ft. As he did so the aircraft stalled and landing heavily, resulting in the aircraft's left stub axle shearing and the nosewheel fork bending. The pilot and passenger were uninjured.

The pilot attributed the accident to being slightly slow and flaring too high.

INCIDENT

Aircraft Type and Registration:	Ikarus C42 FB UK, G-ILRS	
No & Type of Engines:	1 Rotax 912 ULS piston engine	
Year of Manufacture:	2002	
Date & Time (UTC):	5 October 2013 at 1115 hrs	
Location:	East Fortune Airfield, East Lothian	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to left and right wing, and right flap	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	61 years	
Commander's Flying Experience:	65 hours (of which 25 were on type) Last 90 days - 8 hours Last 28 days - 0.5 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

G-ILRS was fitted with a wing-fold mechanism that allowed the wings to be folded back and stowed parallel to the fuselage.

On the day of the accident the pilot reported that he removed the aircraft from its trailer and unfolded the wings with the assistance of another pilot. The pre-flight and start-up checks were uneventful but, approximately 50 feet into the takeoff run, the right wing started to rotate upwards about the fuselage. The pilot immediately abandoned the takeoff.

The cause of the wing rotating upwards was the incorrect fitting of the wing strut lower attachment bolt (Figure 1), which had only passed through the fuselage mounting bracket and not through the strut.



Figure 1

Ikarus C42

The pilot had owned the aircraft for six months during which he had unfolded the wings on approximately six occasions. He said that he rigged the aircraft in

accordance with the C42 Owners Manual. His normal procedure was to ask an assistant to hold the wingtip while he bolted the lower end of the wing strut to the fuselage. He would then check that the wing was

correctly attached by lifting the wingtip. On this occasion he believed that the pilot assisting him had carried out this last check and, therefore, did not feel that it was necessary for him to repeat the check.

ACCIDENT

Aircraft Type and Registration:	Kiss 400-582(1), G-CBMX	
No & Type of Engines:	1 Rotax 582/48-2V piston engine	
Year of Manufacture:	2002 (Serial no: BMAA/HB/207)	
Date & Time (UTC):	31 August 2013 at 1515 hrs	
Location:	Harringe Court Farm Strip, Ashford, Kent	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damaged beyond economic repair	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	67 years	
Commander's Flying Experience:	249 hours (of which 8 were on type) Last 90 days - 2 hours Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot was flying to Harringe Court Farm Strip from Rochester, Kent. The weather was good with the wind from the north at about 5 kt. During the approach to Runway 01 the aircraft "encountered sink" just before it crossed a fence in the undershoot of the strip. The pilot applied full power in an attempt to reduce the descent but one or both of the aircraft's main wheels struck

the fence. The aircraft veered to the right and landed heavily beside the strip in a stubble field. The aircraft's nosewheel dug in and the aircraft came to rest on its right side. The pilot was uninjured. He commented that had he aimed at a reference point further down the strip the aircraft would have "easily cleared the fence".

ACCIDENT

Aircraft Type and Registration:	P & M Aviation QuikR, UR-KWIK	
No & Type of Engines:	1 Rotax 912ULS piston engine	
Year of Manufacture:	2009	
Date & Time (UTC):	7 July 2013 at 2030 hrs	
Location:	Glenforsa Airfield, Isle of Mull, Argyll	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Minor damage to fuselage pod and damage to airfield boundary fence	
Commander's Licence:	Ukrainian Pilot's Licence	
Commander's Age:	26 years	
Commander's Flying Experience:	87 hours (of which 43 were on type) Last 90 days - 43 hours Last 28 days - 41 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and information from the airfield operator	

The Ukrainian-based microlight was about to land on Runway 25 at Glenforsa when the pilot noticed a formation of birds to his left. The birds, believed to be geese or large ducks, were at the same height (about 6 to 8 ft) and crossing ahead of the microlight, passing approximately over the runway threshold. The pilot considered flying a go-around, but thought the chances of colliding with the birds would have been high. He therefore made a late course correction to the left, before turning right again to land diagonally across the runway. The grass surface was wet and, despite turning off the

engine, the pilot was unable to stop the microlight before it ran off the right hand side of the runway. It collided with a boundary fence, sustaining minor damage to the glass fibre pod. Neither occupant was injured. The microlight was subsequently repaired and flew back to the Ukraine.

The airfield operator advised that considerable damage was caused to the airfield boundary fence. The airfield website advised visiting pilots that '*geese are a moderate hazard all year round*'.

ACCIDENT

Aircraft Type and Registration:	Pegasus Quantum 15, G-CCRT	
No & Type of Engines:	1 Rotax 582-40 piston engine	
Year of Manufacture:	2004 (Serial no: 8014)	
Date & Time (UTC):	7 July 2013 at 1245 hrs	
Location:	East Fortune Airfield, East Lothian	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Minor)	Passengers - N/A
Nature of Damage:	Nosewheel, pod, wing keel, mast bent and engine mount bent	
Commander's Licence:	Student	
Commander's Age:	56 years	
Commander's Flying Experience:	49 hours (of which 43 were on type) Last 90 days - n/k Last 28 days - 2 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The student pilot was completing a solo circuit during which it was observed that the wind had become gusty and variable. As the pilot was about to flare for the landing, the aircraft climbed approximately 15 ft. The pilot reacted by lowering the nose but the left wing then lifted, banking the aircraft in excess of 60° and turning

it right. The pilot levelled the wings and was about to go around when the aircraft impacted the runway and skidded off to the side into the perimeter fence. The pilot, who was wearing a protective helmet and lap strap, was unhurt.

ACCIDENT

Aircraft Type and Registration:	SLA 80 Executive, G-CCJJ	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	2003 (Serial no: 180803)	
Date & Time (UTC):	10 August 2013 at 1300 hrs	
Location:	Stoke Airfield, Kent	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to left main landing gear and nose landing gear	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	56 years	
Commander's Flying Experience:	217 hours (of which 89 were on type) Last 90 days - 3 hours Last 28 days - 3 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

The pilot was returning to his home base at Stoke Airfield after a flight from Lydd. Making an approach to Runway 24, he checked that the aircraft's airspeed was good, at 60 to 65 mph, and noted that there was a 7 to 10 kt crosswind from the right and that it was gusting, causing some turbulence. During the final phase of the landing, the aircraft suddenly seemed to "lose lift" and dropped to the runway from a height of about 15 to

20 ft, landing on the left mainwheel. The wheel broke off, causing the aircraft to develop an uncontrollable swing to the left. It came to a sudden halt when it struck a grass embankment at the side of the runway, collapsing the nose landing gear.

The pilot was of the opinion that there had been a sudden change in windspeed causing a loss of lift.

INCIDENT

Aircraft Type and Registration:	Zenair CH 601UL Zodiac, G-BZFY
No & Type of Engines:	1 Rotax 912-S piston engine
Year of Manufacture:	2000 (Serial no: PFA 162A-13547)
Date & Time (UTC):	15 June 2013 at 1830 hrs
Location:	Glebe Farm, Sibson, Leicestershire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Loss of propeller blade, nose and left main landing gear collapse, structural damage to wings and firewall
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	82 years
Commander's Flying Experience:	540 hours (of which 342 were on type) Last 90 days - 13 hours Last 28 days - 5 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and enquiries by the LAA and AAIB

Synopsis

The pilot noticed a vibration through the airframe just after takeoff from a private grass strip. This was followed by a 'thud', a slight displacement of the engine cowling and a loss of engine power. The pilot made a forced landing in a wheat field, during which the nose and left landing gear collapsed, and the firewall and both wings were damaged. The power loss was initiated by the failure and detachment of one of the composite propeller blades, resulting in vibration which caused the carburettors to separate from the engine. The detached propeller blade had suffered a structural failure due to a high cycle oscillation about the blade pitch axis which was caused by a missing component within the coarse pitch stop assembly.

History of the flight

Shortly after takeoff the pilot became aware of a vibration, followed by a 'thud' with a slight movement of the engine cowling. At this point engine power was lost. The pilot immediately made a left turn and carried out a forced landing into a wheat field. During the landing the nose and left landing gear collapsed and the aircraft sustained damage to the engine firewall and to both wings. The pilot was uninjured. On inspecting the aircraft after the accident he saw that one of the propeller blades was missing and the carburettors had detached from the engine. Part of the propeller blade was found on the runway.

Engineering investigation

A detailed examination of the two-bladed Woodcomp Varia composite propeller assembly was carried out by the LAA. It was found that the detached blade had failed circumferentially at its cuff. It was also found that a small stepped washer was missing from the propeller coarse pitch stop mechanism.

Further enquiries by the LAA established that an adjustment had been made to the fine pitch stop and part of that process required the disassembly of the coarse pitch stop. During reassembly the washer had been overlooked and the work had not been checked and signed off by an inspector.

The washer is vital for the correct operation of the pitch control system and is designed to form a spring seat to allow an adjustment bolt to pretension a spring. With no tension in the spring, the propeller blade was free to oscillate about its pitch axis when the engine was running. The resultant high frequency oscillation induced cracks which caused delamination of the composite material throughout the blade and subsequent failure of the blade cuff in tensile overload.

Safety action

The LAA has published its findings in an article in the October 2013 issue of the '*Light Aviation*' magazine.

ACCIDENT

Aircraft Type and Registration:	Zenair CH 601UL Zodiac, G-CDAK
No & Type of Engines:	1 Rotax 912-S piston engine
Year of Manufacture:	2004 (Serial no: PFA 162A-14210)
Date & Time (UTC):	29 September 2013 at 1500 hrs
Location:	Old Park Farm Airfield, near Port Talbot, South Wales
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to landing gear, propeller and left wing
Commander's Licence:	Private Pilot's Licence
Commander's Age:	81 years
Commander's Flying Experience:	1,708 hours (of which 351 were on type) Last 90 days - 30 hours Last 28 days - 9 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

The aircraft was landing in a northerly direction at a grass airstrip. The pilot had not obtained a weather forecast and was unable to provide an assessment of weather conditions. However, he reported that a severe gust of wind lifted the right wing just before landing, when the aircraft was at a height of about 50 ft. There

was insufficient height or speed for the pilot to correct the situation. The aircraft came to rest to the west of the airstrip, upright and facing back towards the landing threshold. The pilot was uninjured and able to vacate the aircraft normally. He reported that the landing gear, propeller and left wing were damaged in the accident.

Miscellaneous

This section contains Addenda, Corrections and a list of the ten most recent Aircraft Accident ('Formal') Reports published by the AAIB.

The complete reports can be downloaded from the AAIB website (www.aaib.gov.uk).

BULLETIN CORRECTION

Aircraft Type and Registration:	Valentin Taifun 17E, D-KFIH
Date & Time (UTC):	11 August 2013, 1245 hrs
Location:	Weybourne (Muckleburgh) Airfield, Norfolk
Information Source:	Aircraft Accident Report Form

AAIB Bulletin No 11/2013, page 40 refers

The correct date of manufacture of the aircraft is 1985.

The online version of this report was corrected prior to publication.

**TEN MOST RECENTLY PUBLISHED
FORMAL REPORTS
ISSUED BY THE AIR ACCIDENTS INVESTIGATION BRANCH**

1/2010	Boeing 777-236ER, G-YMMM at London Heathrow Airport on 17 January 2008. Published February 2010.	6/2010	Grob G115E Tutor, G-BYUT and Grob G115E Tutor, G-BYVN near Porthcawl, South Wales on 11 February 2009. Published November 2010.
2/2010	Beech 200C Super King Air, VQ-TIU at 1 nm south-east of North Caicos Airport, Turks and Caicos Islands, British West Indies on 6 February 2007. Published May 2010.	7/2010	Aerospatiale (Eurocopter) AS 332L Super Puma, G-PUMI at Aberdeen Airport, Scotland on 13 October 2006. Published November 2010.
3/2010	Cessna Citation 500, VP-BGE 2 nm NNE of Biggin Hill Airport on 30 March 2008. Published May 2010.	8/2010	Cessna 402C, G-EYES and Rand KR-2, G-BOLZ near Coventry Airport on 17 August 2008. Published December 2010.
4/2010	Boeing 777-236, G-VIIR at Robert L Bradshaw Int Airport St Kitts, West Indies on 26 September 2009. Published September 2010.	1/2011	Eurocopter EC225 LP Super Puma, G-REDU near the Eastern Trough Area Project Central Production Facility Platform in the North Sea on 18 February 2009. Published September 2011.
5/2010	Grob G115E (Tutor), G-BYXR and Standard Cirrus Glider, G-CKHT Drayton, Oxfordshire on 14 June 2009. Published September 2010.	2/2011	Aerospatiale (Eurocopter) AS332 L2 Super Puma, G-REDL 11 nm NE of Peterhead, Scotland on 1 April 2009. Published November 2011.

Unabridged versions of all AAIB Formal Reports, published back to and including 1971,
are available in full on the AAIB Website

<http://www.aaib.gov.uk>