Air Accident Investigation Unit Ireland

SYNOPTIC REPORT

ACCIDENT
Beechcraft Duchess 76, EI-BUN
Weston Aerodrome (EIWT)
22 May 2014

An Roinn Iompair
Turasóireachta agus Spóirt

Department of Transport,
Tourism and Sport

Foreword

This safety investigation is exclusively of a technical nature and the Final Report reflects the determination of the AAIU regarding the circumstances of this occurrence and its probable causes.

In accordance with the provisions of Annex 13[1] to the Convention on International Civil Aviation, Regulation (EU) No 996/2010[2] and Statutory Instrument No. 460 of 2009[3], safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation and Final Report is the prevention of accidents and incidents.

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

Extracts from this Report may be published providing that the source is acknowledged, the material is accurately reproduced and that it is not used in a derogatory or misleading context.

[1] **Annex 13**: International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.

[2] **Regulation (EU) No 996/2010** of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.

[3] **Statutory Instrument (SI) No. 460 of 2009**: Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations 2009.

AAIU Report No: 2015 - 003
State File No: IRL00914037
Report Format: Synoptic Report
Published: 18 February 2015

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI 460 of 2009, the Chief Inspector of Air Accidents on 22 May 2014 appointed Mr Thomas Moloney as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	**Beechcraft Duchess 76, EI-BUN**
No. and Type of Engines:	**1 x Lycoming O-360-A1G6D, 1 x Lycoming LO-360-A1G6D**
Aircraft Serial Number:	**ME-371**
Year of Manufacture:	**1980**
Date and Time (UTC[4]):	**22 May 2014 @ 12.33 hrs approximately**
Location:	**Weston Aerodrome (EIWT), Co Kildare, Ireland**
Type of Operation:	**General Aviation - Training Flight**
Persons on Board:	**Crew - 2 Passengers - Nil**
Injuries:	**Crew - Nil Passengers - Nil**
Nature of Damage:	**Substantial**
Commander's Licence:	**CPL[5] issued by UK Civil Aviation Authority (CAA)**
Commander's Details:	**Male, aged 49 years**
Commander's Flying Experience:	**5,200 hours, of which 330 were on type**
Notification Source:	**Air Traffic Services EIWT**
Information Source:	**AAIU Field Investigation**

[4] **UTC:** Co-ordinated Universal Time. All times in the Report are UTC unless stated. Add one hour for local time.
[5] **CPL:** Commercial Pilot Licence

SYNOPSIS

A Student Pilot was carrying out his first landing in a twin-engined aircraft. Following a normal touchdown, the Instructor noticed that the aircraft was drifting to the right and that the starboard wing was starting to drop. The Student and Instructor both attempted to maintain directional control of the aircraft. However, the two right-hand propeller blades made contact with the runway surface and the aircraft departed the paved surface to the right. Subsequent examination showed that the right-hand landing gear had collapsed due to a fatigue failure of the A-frame, which is part of the landing gear down-lock mechanism. The aircraft sustained substantial damage. There were no injuries. The Report contains two Safety Recommendations.

1. FACTUAL INFORMATION

1.1 History of the Flight

The aircraft departed from Runway (RWY) 07 at EIWT at 11.20 hrs on a training detail, with an Instructor and Student on board. It was the Student's first flight on a multi-engine type and the purpose of the flight was to demonstrate the general handling characteristics of a twin-engined aircraft. EI-BUN routed to a training area west of EIWT where the Instructor demonstrated, and the Student performed, various manoeuvres including climbs, descents, slow flight, steep turns as well as trim changes due to extension of the flaps and landing gear. Thereafter, the aircraft returned to EIWT via Kilcock and joined a left base leg for an approach to RWY 07. The Instructor demonstrated the approach and executed a touch-and-go landing. He described this as *"absolutely normal"* with no adverse indications on the climb-out as the landing gear was retracted.

The Instructor then passed control of the aircraft to the Student who carried out the pre-landing checks on the downwind leg and selected the landing gear down as the aircraft turned finals to RWY 07. The Instructor confirmed *"three greens"*, which was a check to indicate that the three landing gear legs were down and locked. At 300 ft above ground level, the Instructor again confirmed three greens.

The Student made what the Instructor described as a very smooth touchdown on the runway centre-line with no bounce, especially considering that it was the Student's first landing in a twin. As the aircraft decelerated through 50 kts, the Instructor noticed that it was starting to drift to the right and he instructed the Student to apply left rudder, to which the Student responded *"I am"*. At that point, the Instructor saw that the attitude of the aircraft was beginning to change in that the starboard wing was starting to drop. The Instructor took control of the aircraft and applied maximum left rudder in an attempt to maintain directional control. He heard a scraping sound just after he took control. The aircraft continued to drift to the right and departed off the asphalt runway surface onto the grass. The Instructor recalled that he closed the throttles, retarded the mixture controls and switched off the magnetos, alternators and master switch. Once the aircraft came to a halt, he instructed the Student to evacuate the aircraft and to move away from it. Thereafter, he also evacuated the aircraft through his crew door. Neither occupant was injured.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	0	0	0
Serious	0	0	0
Minor/None	2	0	

1.3 Damage to Aircraft

During the accident sequence, the rotating right-hand (R/H) propeller made contact with the runway surface, resulting in damage to both propeller blades. Damage was also caused to the R/H flap assembly, the R/H aileron and the under-surface of the rear part of the aircraft fuselage. During recovery of the aircraft, it became evident that the R/H main landing gear (MLG) side brace, known as the A-frame assembly, had failed. The down tube and the diagonal tube of the A-frame were both fractured, **Photo No. 1**. The part number (P/N) of the R/H A-frame was difficult to discern as the final two digits were very faint. However, correspondence with the aircraft Manufacturer confirmed that the P/N was 105-810023-76.

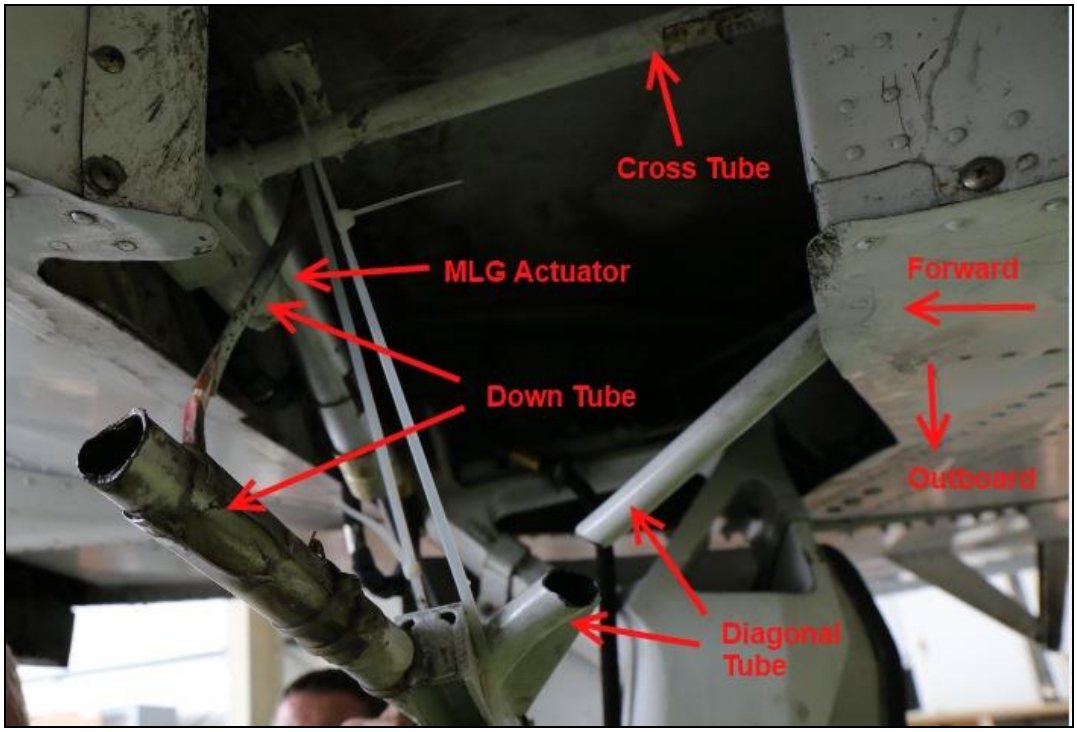

Photo No. 1: Fractured Side Brace (A-frame) Tubes

1.4 Personnel Information

The Instructor held a CPL issued by the UK CAA and also held a Class 1 Medical Certificate. He had successfully undertaken a Proficiency Check for renewal of his Multi-Engine Class Rating on the accident type with an Irish Aviation Authority (IAA) examiner on 12 May 2014. His Flight Instructor rating was valid until 30 April 2016. He had total flying experience of 5,200 hours of which 330 were on type.

The Student held a Private Pilot Licence (PPL) issued by the UK CAA and also held a Class 1 Medical Certificate. Prior to the occurrence flight he had total flying experience of approximately 150 hours, all on single-engine piston types. He had completed his CPL checks one week prior to the accident.

1.5 Aircraft Information

1.5.1 General

EI-BUN, a Beechcraft Duchess 76, was manufactured in 1980. It is an all-metal low-wing monoplane with a T-tail and retractable tricycle landing gear. It is powered by two piston engines, one Lycoming O-360-A1G6D on the port wing and one LO-360-A1G6D on the starboard wing. The engines drive constant-speed, full-feathering, two-bladed, aluminium alloy Hartzell propellers, which rotate clockwise on the port engine and counter-clockwise on the starboard engine. The maximum take-off weight is 3,900 lbs (1,769 kgs).

1.5.2 Landing Gear

A hydraulic pump driven by an electric motor supplies hydraulic pressure through a manifold and shuttle valve to hydraulic actuators, one mounted in each wheel-well, to extend and retract the landing gear. In the retract mode, the electric motor rotates the pump which forces hydraulic fluid through the manifold to the retract side of the system. The actuator is attached to a machined fitting at the top of the down tube of a spring loaded side brace, known as the A-frame, one of which is installed as part of each side's MLG assembly. The landing gear is held in the up position using an up-lock check valve, in the pump, which retains hydraulic pressure. In the extend mode, the motor rotates the pump in the opposite direction and forces hydraulic fluid through the manifold and shuttle valve to the extend side of the system. MLG down-lock is accomplished by over-centre travel of the spring-held side brace (A-frame).

1.5.3 Maintenance History

Documentation provided to the Investigation recorded *"Modified "A" frame fitted"* to EI-BUN on 16 January 2002 at a total aircraft operating time of 2882.9 hours. This was noted as a Method of Compliance with Airworthiness Directive (AD) 97-06-10 (See **Section 1.8**).

At the time of the occurrence, EI-BUN was being maintained under a maintenance programme which was originally approved by the IAA in September 2011. The programme was based on the Beechcraft Continuing Care Inspection Guide for the Model 76 Duchess.

EI-BUN had sustained damage in another landing gear event on 20 September 2013, when the flying time was 6108.9 hours (See **AAIU Final Report 2015-001**). In the earlier accident, the left-hand (L/H) MLG had collapsed, but with different causal factors than in this case. The Operator returned the aircraft to service by means of an Annual Inspection and damage repairs, which were carried out between 14 October 2013 and 19 December 2013. In the section of the Annual Inspection dealing with Main Gear and Brakes, an inspection of *"the shock strut and components for condition, attachment, proper inflation and leakage"* was signed off, as was a check on the condition, security and corrosion of the gear doors. The Inspection also included landing gear retraction tests, all of which were certified.

Several supplemental worksheets were also included in the workpack, detailing inspections for damage sustained in the previous accident and any repair work which was required. A worksheet recorded that the L/H MLG had been stripped for inspection for any damage. An entry, *"Inspect 'A-frame' assembly for cracks or damage"* was also recorded and certified. Another worksheet recorded that the R/H MLG was stripped and that the *"fork assembly, shock absorber and attachments"* were inspected for cracks and damage.

The aircraft records also included a copy of FAA[6] Special Airworthiness Information Bulletin (SAIB) CE-12-24 (See **Section 1.8**) which recommends continuing inspection for cracking of the applicable A-frame assemblies. The document was annotated "*Checked This Time*".

The Aircraft Inspector who released the aircraft to service following the Annual Inspection and repairs at 6108.9 hours confirmed to the Investigation that he had carried out both visual and dye-penetrant inspection of the two A-frames and that there had been no evidence of cracks at that time.

An IAA Certificate of Airworthiness was issued for EI-BUN on 8 May 2014. The most recent Airworthiness Review Certificate was issued on 20 December 2013 with an expiry date of 19 December 2014. The total number of hours recorded in the aircraft logbook up to 21 May 2014 was 6,205.1. This did not include the occurrence flight. Cycles for aircraft or its landing gear were not recorded.

1.6 Meteorological Information

The wind at the time of the occurrence was 010°/11 kts and the visibility was greater than 10 km. The cloud was 'scattered' at 1,100 ft and 'broken' at 1,900 ft. The temperature was +13°C and the dew-point was +9°C.

1.7 Tests and Research

Following recovery of EI-BUN to a hangar, the Operator removed the R/H A-frame from the aircraft and it was passed to the AAIU. The Investigation was aware that A-frames on the Beechcraft Duchess 76 were the subject of earlier airworthiness documentation (See **Section 1.8**). Therefore the Investigation decided to send the subject A-frame to a specialist facility in the UK for detailed metallurgical examination and analysis.

[6] **FAA**: United States Federal Aviation Administration.

Photo No. 2 shows a top view of the component as shipped. The fracture surfaces are identified as A1 and A2 for the down tube and B1 and B2 for the diagonal tube.

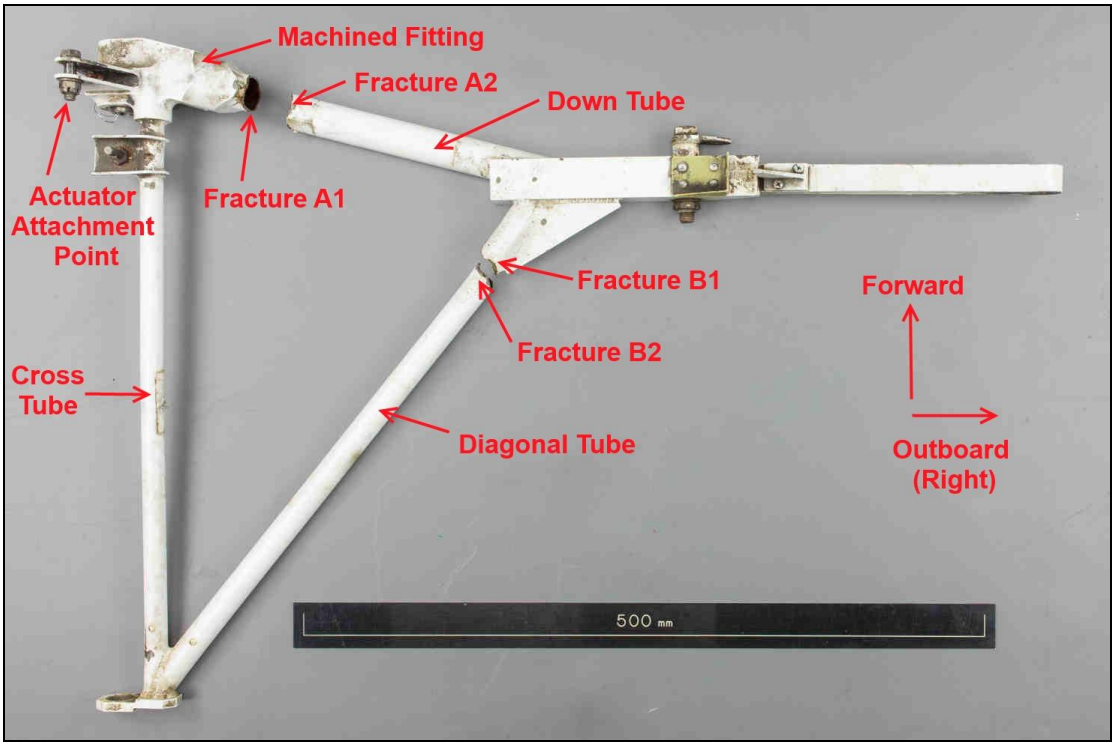

Photo No. 2: A-Frame as Shipped for Metallurgical Analysis

The conclusions reached following metallurgical analysis at the UK facility were as follows.

"Examination of the down tube fracture surface shows the presence of two areas of fatigue cracking, orientated 180 degrees from each other, one on the downward facing side, the other on the upper surface of the tube. This is consistent with fatigue crack growth associated with reverse bending of the tube. The location of the fatigue fractures is consistent with the stresses developed from the bending moments applied to the down tube when raising and lowering the main landing gear as well as during take-off, landing and taxiing. The amount of mechanical damage observed on the fatigue crack on the lower surface of the down tube is consistent with either prolonged rubbing of the mating fracture surfaces or a larger compression loading of the region during final failure."

Photo No. 3 shows the location of the fatigue crack on the upper part of the down tube fracture, identified as fracture A1. The fatigue crack (fatigue crack (1)) is located adjacent to the toe of the fillet weld on the downward face of the machined fitting. The fatigue crack at this location had propagated completely through the wall thickness of the down tube. The second area of fatigue cracking located on the opposite side of the upper part of the down tube had also propagated through the wall thickness of the down tube.

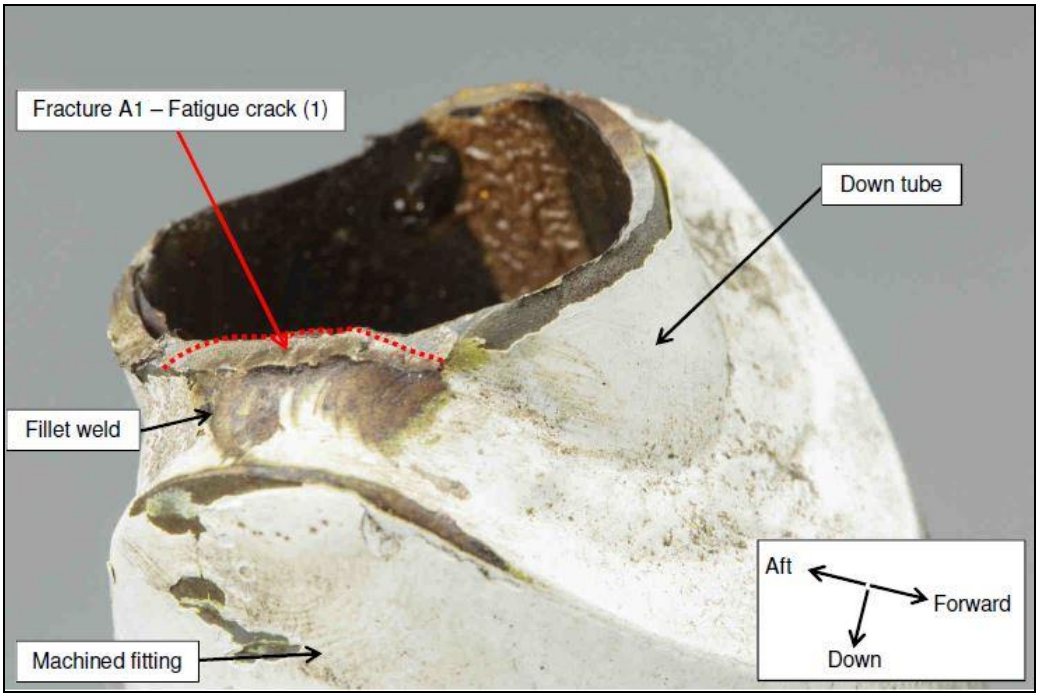

Photo No. 3: Fatigue Crack (1) on the Upper Part of the Down Tube Fracture A1

The metallurgical examination conclusions continue as follows.

"The two areas of fatigue cracking exhibit features consistent with multiple origin fatigue cracking, with the individual fatigue cracks merging together during propagation of the cracks. The fatigue cracks have initiated on the external surface of the down tube, adjacent to the fillet weld toe. This location of the structure has the largest change in stiffness, but also exhibits the highest hardness and lowest ductility associated with the heat affected zone (HAZ) microstructure of the weld.

Both of the fatigue cracks have propagated through the wall thickness. Once these cracks had grown to a critical size the remainder of the down tube has fractured in overload. The macro appearance of overload failure regions of the down tube suggest that the tube has finally fractured from the upper surface of the tube, with the fracture progressing around the tube to the lower fatigue crack.

The external surface of the downward facing side of the tube in the location of fatigue crack (1) shows evidence of mechanical scoring / wear. The substrate steel is exposed in this location and the surrounding paint layers show "feathering" consistent with abrasion. The exposed steel substrate shows evidence of corrosion and the polished microsections of the fracture location show corrosion pitting of both the weld and down tube surfaces. Corrosion pitting can initiate fatigue cracks, however, no evidence of corrosion pitting was observed at the origin of the fatigue cracks examined.

A localised change in wall thickness was observed in the down tube adjacent to fatigue crack (1). This change in wall thickness appears as a "bulge" with the length of the feature similar to that of the fatigue crack width. The even deformation of the microstructure in both sides of the "bulge" suggests deformation from compression loading in this location. The bulge also coincides with the region of lowest hardness in the outer area of the HAZ close to the weld.

It is therefore surmised that the down tube has failed by the formation and propagation of two multiple-origin fatigue cracks due to reverse bending loading of the structure. Once these cracks had grown to a critical size the remainder of the down tube has fractured in overload from the upper surface of the tube, with the overload fracture progressing around the tube to the lower fatigue crack. The loads applied to the tube during final overload have resulted in localised compression loading at the location of the lower fatigue crack which has formed the bulge of material in the region of the softer HAZ.

Examination of the diagonal tube fracture surfaces shows this tube to have fractured by ductile overload. This was most probably a secondary failure due to transfer of the loads to a smaller diameter tube after failure of the down tube."

1.8 Additional Information

In 1991, the FAA issued AD 91-14-14 to address the development of cracking and subsequent failures in the original MLG A-frame assemblies installed on Beechcraft Duchess 76 aircraft. AD 91-14-14 mandated repetitive inspections for cracks. This AD was superseded in 1997 by AD 97-06-10 which stated that aircraft with "improved" MLG A-frame assemblies were exempt from the repetitive inspections. The original A-frame utilised a welded cluster at the top of the down tube, whereas the improved assembly utilised a machined fitting with the down tube fillet welded into the fitting. AD 97-06-10 references Raytheon Mandatory Service Bulletin (SB) No. 2361, Revision III dated June 1996. This SB details fatigue crack inspection procedures for Beechcraft Duchess 76 A-frames unless the improved assemblies, identified by P/Ns 105-810023-75 (L/H) and 105-810023-76 (R/H), had been installed.

In accordance with SB No. 2361 Revision III, AD 97-06-10 required that aircraft which did not have the improved A-frame assemblies should be inspected for cracks in areas adjacent to the welded cluster, using both visual and dye penetrant methods, at intervals not exceeding 100 hours time-in-service.

In 2012, the FAA issued SAIB CE-12-34 which is reproduced at **Appendix A**. This Bulletin was intended to inform interested parties of cracking of P/Ns 105-810023-75 and -76 A-frames. The SAIB states, *"Since the issuance of AD 97-06-10, there have been several reports of cracking (or even complete failure during landing and taxi operations) of P/Ns 105-810023-75 and 105-810023-76. Hawker Beechcraft Corporation and the FAA have been unable to determine whether the cracking is due to fatigue, static overload, or poor maintenance."* The SAIB continues, "*The FAA recommends continuing inspection of the "A" frame assemblies with P/Ns 105-810023-75 and 105-810023-76 even though AD 97-06-10 does not mandate such an inspection. Performing a 100-hour repetitive inspection, at a minimum, is still recommended.*"

The US National Transportation Safety Board (NTSB) informed the Investigation of an accident in 2009 (NTSB ID WPR09LA383) in which a Beechcraft Duchess 76 sustained substantial damage following the collapse of its L/H MLG. The aircraft had come to a halt just after landing and taxiing to a parking area. The NTSB reported that the P/N 105-810023-75 A-frame's down tube had fractured adjacent to its fillet weld. Their examination revealed that the location of the fracture regions in the down tube were consistent with the stresses developed from the bending moments applied to the down tube when raising and lowering the MLG, as well as during take-off, landing and taxiing.

Hawker Beechcraft Communiqué #135 issued in 2012 states that the Manufacturer received one report of a crack in P/N 105-810023-75, after an aircraft started to slide while undergoing a ground run on a slick surface. The Communiqué reminds owners and operators of the importance of inspecting aircraft in accordance with the applicable manuals. It states, *"The landing gear components (in their entirety) are inspected every 100 hours/annually per the* […] *Maintenance Manual."* It also notes that FAA Advisory Circular 43.13 states, with respect to inspection and maintenance of landing gear, *"9-2 GENERAL INSPECTION. A thorough inspection of the landing gear involves the entire structure of the gear, including attachments, struts, wheels, brakes, actuating mechanism for retractable gears, gear hydraulic system and valves, gear doors, and all associated parts. The manufacturer's inspection procedures should be followed where applicable.*

g. The entire structure of the landing gear *should be closely examined for cracks, nicks, cuts, corrosion damage, or any other condition that can cause stress concentrations and eventual failure."*

The Operator of EI-BUN put the Investigation in contact with an overseas repair organisation which has accumulated considerable experience with cracked 105-810023-75 and 105-810023-76 A-frames. The repair organisation informed the Investigation that they were aware of more than 30 cracked A-frames which required repair. They provided the Investigation with a number of photographs of failed A-frames, with fractures exhibiting similar features to the failure on EI-BUN. The Investigation provided the FAA with contact details for the repair organisation.

2. ANALYSIS

Examination of the R/H MLG A-frame at a specialist metallurgical facility confirmed that the assembly's down tube fractured due to the formation and propagation of two fatigue cracks. These cracks were located opposite each other on the tube, adjacent to the fillet weld on the downward face of a machined fitting. Both cracks had propagated through the entire down tube wall and once they had grown to a critical size, the remainder of the down tube fractured in overload. The fracture of the diagonal tube was due to ductile overload when the loads were transferred to this smaller diameter tube after the down tube had failed.

Once the A-frame failed in this manner, the R/H MLG down-lock mechanism was no longer viable, resulting in the collapse of the R/H landing gear. Despite the efforts of the crew to maintain directional control by means of the flight controls, it was inevitable that the starboard wing would drop as the aircraft decelerated and lift was lost, allowing the propeller blades on that side to make contact with the runway surface.

Thereafter, the aircraft veered to the right and exited the paved surface, with resultant damage to the starboard flaps, aileron and the fuselage undersurface.

The subject A-frame had been installed on EI-BUN in January 2002 at an aircraft time of 2882.9 hours and had thus been in service for in excess of 3,320 flying hours when it failed. The certifying Inspector stated that the most recent visual and dye penetrant inspection of the A-frame had been carried out during an Annual Inspection and repair work performed at 6,108.9 hours, just less than 100 flying hours before the accident. The Investigation notes that these specific checks of the A-frame were recommended by the FAA but not mandated.

Metallurgical examination showed that the nature of the multiple origin fatigue cracks was consistent with fatigue crack growth associated with reverse bending loading of the down tube. The location of the fatigue fractures was consistent with the stresses associated with the bending moments applied to the down tube when raising and lowering the MLG as well as during take-off, landing and taxiing. The examination revealed no evidence of corrosion pitting which might have initiated the fatigue cracks.

The Investigation is aware of a similar landing gear collapse event which occurred in the USA, which was also identified as being due to fatigue failure. Reports and photographic data received from an overseas repair organisation further suggest that there have been multiple cracks/failures involving the improved A-frames, although it is acknowledged that these cases have not been the subject of metallurgical examination.

Early versions of the Beechcraft Duchess 76 A-frames were subject to AD action which required visual and dye-penetrant crack inspection at 100-hour intervals. Development of the "improved" A-frame 105-810023-75 and 105-810023-76 assemblies was followed by a new AD 97-06-10 which exempted the -75 and -76 assemblies from these repetitive inspections. However, in 2012 the FAA issued SAIB CE-12-34 which recommended *"performing a 100-hour repetitive inspection, at a minimum"*, due to cracking of these assemblies, *"even though AD 97-06-10 does not mandate such an inspection"*.

It was reported that visual and dye penetrant inspections of the subject A-frame were carried out approximately 100 hours before the accident, and no evidence of cracking was detected at that time. Notwithstanding this, when evidence of down tube cracks on other aircraft is taken into consideration, the Investigation believes that repetitive inspection of -75 and -76 A-frames should be mandated.

Therefore, two Safety Recommendations are issued, one to the FAA and one to the aircraft Manufacturer.

Safety Recommendation No. 1
It is recommended that the Federal Aviation Administration should consider mandating repetitive visual and non-destructive inspections of Beechcraft Duchess 76 A-frames P/Ns 105-810023-75 and 105-810023-76.
(**IRLD2015005**)

Safety Recommendation No. 2
It is recommended that Textron Aviation should consider amending the Beechcraft Duchess 76 Maintenance Manual to include specific reference to mandatory repetitive visual and non-destructive inspections of A-frames P/Ns 105-810023-75 and 105-810023-76.
(**IRLD2015006**)

3. CONCLUSIONS

(a) Findings

1. The Instructor held a valid CPL and a Flight Instructor's rating.
2. The Student was on his first instructional flight in a twin-engined aircraft.
3. The aircraft held a valid Certificate of Airworthiness and Airworthiness Review Certificate.
4. The landing immediately prior to the landing gear collapse was normal.
5. As the aircraft decelerated along the runway following touchdown, the starboard landing gear collapsed and the aircraft veered off the runway surface to the right.
6. The aircraft sustained substantial damage in the accident.
7. The down tube of the starboard landing gear A-frame failed due to the development and propagation of two fatigue cracks at opposite sides of the tube.
8. Growth of the fatigue cracks was associated with reverse bending loading of the down tube.
9. The location of the fracture was consistent with the stresses associated with the bending moments applied to the down tube when raising and lowering the main landing gear as well as during take-off, landing and taxiing.
10. Failure of the A-frame rendered the starboard landing gear down-lock mechanism unviable.
11. The Investigation became aware of similar occurrences involving fatigue failure of P/N 105-810023-75 and -76 A-frame down tubes.

12. An FAA Special Airworthiness Information Bulletin issued in 2012 recommended continuing inspection for cracks in P/N 105-810023-75 and -76 A-frame assemblies, but did not mandate such inspections.

(b) Probable Cause

Collapse of the starboard main landing gear, due to fatigue failure of the A-frame which rendered the downlock mechanism unviable.

(c) Contributory Cause

The development and propagation of two undetected fatigue cracks at opposite sides of the A-frame down tube, which were associated with reverse bending loading of the tube.

4. SAFETY RECOMMENDATIONS

No.	It is Recommended that:	Recommendation Ref.
1.	The Federal Aviation Administration should consider mandating repetitive visual and non-destructive inspections of Beechcraft Duchess 76 A-frames P/Ns 105-810023-75 and 105-810023-76.	IRLD2015005
2.	Textron Aviation should consider amending the Beechcraft Duchess 76 Maintenance Manual to include specific reference to mandatory repetitive visual and non-destructive inspections of A-frames P/Ns 105-810023-75 and 105-810023-76.	IRLD2015006

View Safety Recommendations for Report 2015-003

Appendix A

FAA
Aviation Safety

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SAIB: CE-12-34
Date: June 12, 2012

SUBJ: Main Landing Gear: Cracking "A" Frame Assemblies

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin (SAIB) is intended to inform you, owners, operators and maintenance personnel, of cracking of part number (P/N) 105-810023-75 and P/N 105-810023-76 main landing gear (MLG) "A" frame assemblies on **Hawker Beechcraft Model Series 76 (also referred to as Beechcraft Duchess) airplanes**.

At this time, this airworthiness concern has not been determined to be an unsafe condition that would warrant airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR) part 39.

Background

Airworthiness Directive (AD) 91-14-14 was issued to address the development of cracking and subsequent failures in MLG "A" frame assemblies, which could result in the loss of control of an airplane during landing operations. AD 91-14-14 was then superseded by AD 97-06-10 to provide an exemption for airplanes that have "improved" MLG "A" frame assemblies installed. These improved "A" frame assemblies are identified by P/Ns 105-810023-75 and 105-810023-76. AD 97-06-10 also allows the installation of these improved "A" frame assemblies to eliminate the repetitive inspection requirement.

Since the issuance of AD 97-06-10, there have been several reports of cracking (or even complete failure during landing and taxi operations) of P/Ns 105-810023-75 and 105-810023-76. Hawker Beechcraft Corporation and the FAA have been unable to determine whether the cracking is due to fatigue, static overload, or poor maintenance. The data obtained from service difficulty reports has also not been sufficient to determine the exact cause of cracking. It is known that many of these airplanes are used in training operations and can see a high number of landing cycles as compared to those airplanes used in normal operation.

Recommendations

The FAA recommends continuing inspection of the "A" frame assemblies with P/Ns 105-810023-75 and 105-810023-76 even though AD 97-06-10 does not mandate such an inspection. Performing a 100- hour repetitive inspection, at a minimum, is still recommended.

The FAA also recommends submitting reports of cracking or failures of P/Ns 105-810023-75 and 105-810023-76 in order to support the continued operational safety of the Beechcraft Model 76 fleet It is also recommended to provide additional data and any other information pertinent to this issue.

1

A sample reporting form can be found in Attachment 1. Please submit completed report forms to the Wichita Aircraft Certification Office (ACO) at the following address:

Wichita ACO
1801 Airport Road, Room 100
Mid-Continent Airport
Wichita, KS 67209

or email: WICHITA-COS@FAA.GOV, include the information from the attachment in the email. Please identify MLG: HBC 76, in the subject line if submitted through email.

Under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 et seq.), the Office of Management and Budget (OMB) has approved the information collection contained in this SAIB, and assigned OMB Control Number 2120-0731.

For Further Information Contact

Adam Neubauer, Aviation Safety Engineer, Wichita Aircraft Certification Office, 1801 Airport Road, Room 100, Wichita, Kansas 67209; phone: (316) 946-4156; fax: (316) 946-4107; e-mail: Adam.Neubauer@faa.gov.

Attachment 1

Beechcraft Model 76 "A" Frame (P/Ns 105-810023-75/-76) Status Report				
Airplane S/N	**Airplane hours**	**Part hours (or cycles)**	**Part status (e.g. no cracks, cracked, failed)**	**Date part installed**

3

- END –

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No. 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of this investigation is to prevent aviation accidents and serious incidents. It is not the purpose of any such investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

Produced by the Air Accident Investigation Unit

AAIU Reports are available on the Unit website at www.aaiu.ie

An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

Air Accident Investigation Unit,
Department of Transport Tourism and Sport,
2nd Floor, Leeson Lane,
Dublin 2, Ireland.
Telephone: +353 1 604 1293 (24x7): or
+353 1 241 1777
Fax: +353 1 604 1514
Email: info@aaiu.ie
Web: www.aaiu.ie