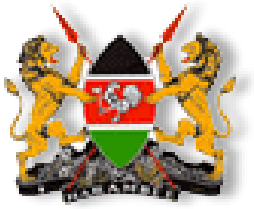
REPUBLIC OF KENYA



MINISTRY OF ROADS AND TRANSPORT

STATE DEPARTMENT FOR TRANSPORT

AIRCRAFT ACCIDENT INVESTIGATION

REPORT OF THE SERIOUS INCIDENT INVOLVING

DHC8-300

REGISTRATION 5Y-BWG

ON 28TH OCTOBER 2019

AT LODWAR TURKANA

OBJECTIVE

This report contains factual information which has been determined up to the time of publication. The information in this report is published to inform the aviation industry and the public of the general circumstances of the accident.

This investigation has been carried out in accordance with The Kenya Civil Aviation Regulations, 2018 and Annex 13 to the ICAO Convention on International Civil Aviation.

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

INVESTIGATION PROCESS

The Air Accident Investigation Department (AAID) was notified of this accident on 28th October, 2019 the same day of the accident, and the investigator in-charge was nominated with an assistant and assigned the exercise. Arrangement was made with the airline for transport to Eldoret International Airport for the exercise. The team arrived at HKEL on 29th October, 2019

Notification to the State of Manufacturer and ICAO were also made after the preliminary report was issued.

AIRCRAFT ACCIDENT INVESTIGATION

OPERATOR/OWNER	:	Silverstone Air Services
AIRCRAFTTYPE/ MANUFACTURER	:	DHC8-300
YEAR OF MANUFACTURE	:	1995
REGISTRATION	:	5Y-BWG
SERIAL NUMBER	:	406
DATE OF REGISTRATION	:	18 November 2016
NUMBER AND TYPE OF ENGINE	:	2, P&W 123
DATE OF OCCURRENCE	:	28 October, 2019
TIME OF OCCURRENCE	:	0800hrs
LOCATION OF OCCURRENC	:	Lodwar
TYPE OF FLIGHT	:	Commercial Passenger
PHASE OF FLIGHT	:	Take-off
PERSONS ONBOARD	:	9
INJURIES	:	Nil
NATURE OF DAMAGE	:	Slight
CATEGORY OF OCCURRENCE	:	Serious Incident
PILOT IN COMMAND (PIC)	:	ATPL
PIC'S FLYING EXPERIENCE	:	2700hrs

All times given in this report is Universal Coordinated Time (UTC), with East African Local time in parenthesis

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LIST OF ABBREVIATIONS/GLOSSARY OF TERMS

ADC	-	Air Data Computer
AMSL	-	Above Mean Sea Level
ATPL	-	Airline Transport Pilot License
HKEL	-	Eldoret International Airport
HKLO	-	HKLO
ICAO	-	International Civil Aviation Organization
ICAO	-	International Civil Aviation Organization
KCAA	-	Kenya Civil Aviation Authority
LBS	-	Pounds
NM	-	Nautical miles
TAC	-	Tach time
TAT	-	Turn-around time
VHF	-	Very High Frequency

SYNOPSIS

On 28th October 2019 at 0617 hours a commercial passenger Dash 8-300, operated by Silverstone Air Services Ltd, registration, 5Y-BWG lost its wheel no 3 on take-off at Lodwar Airport (HKLO). The aircraft was on a scheduled flight from Lodwar to Nairobi and had 4 passengers onboard with 5 crew members. According to an eye witness the aircraft took-off on runway 09, when during lift-off, wheel number 3 fell off. The airport personnel at Lodwar who witnessed the wheel detach fell off attempted to radio the pilot flying 5Y-BWG without success as the aircraft was out of range. Arrangement was made and the pilot on 5Y-BWG was contacted with another pilot flying within the vicinity on radio. The pilot was to divert to Eldoret International Airport (HKEL) for emergency landing

Management at HKEL was also alerted prior to the emergency landing and necessary arrangement made to receive the aircraft including fire and rescue.

. On landing the pilot executed a safe crosswind landing to avoid putting much weight on the remaining wheel.

He landed safely and persons onboard disembarked. The detached wheel assembly was later recovered by the public outside HKLO, in Turkana County. The company later sent a team of engineers from Nairobi who repaired the aircraft before it was flown to Nairobi for further maintenance.

Investigation findings revealed that, the axle did not sustain any visible damage both internally and externally, the brake assembly had minor scratches no broken parts and was serviceable, the wheel transducer sustained no damage and the entire airframe and wheel well had no visible damage. Further investigation indicated that the probable cause of the serious incident was most likely failure of either one or both bearings on the number three wheel assembly. The investigation

recommended that Silverstone undertakes a reviews its safety management systems on aircraft maintenance.

1. FACTUAL INFORMATION

1.1 HISTORY OF FLIGHT

On 28th October 2019 at 0617 hours a commercial passenger aircraft Dash 8-300, operated by Silverstone Air Services Ltd, registration, 5Y-BWG lost its wheel no 3 on take-off at Lodwar Airport (HKLO). The aircraft was on a scheduled flight from Lodwar to Nairobi Wilson and had 4 passengers onboard with 5 crew members. According to an eye witness, the aircraft took-off on runway 09, when during lift-off, wheel number 3 fell off. The airport personnel at Lodwar who witnessed the wheel detach and fell off attempted to radio the pilot flying 5Y-BWG without success as the aircraft was out of range. Arrangement was made and the pilot contacted with another pilot flying within the vicinity on radio.

After receiving information the pilot contacted their base station for instructions. He was instructed to divert to Eldoret International Airport for emergency landing. Management at HKEL was also alerted prior to the emergency landing and necessary arrangement made to receive the aircraft by providing the fire and rescue team near the runway.

The pilot landed at HKEL successfully after executing a safe crosswind landing to avoid putting much weight on the remaining wheel. The company later sent a team of engineers from Nairobi for evacuation after notification of the serious incident to AAID. It was repaired and flown to Nairobi Wilson for further maintenance.

1.2 Injuries to Persons

	Crew	Passengers	Other
Fatalities	0	0	0
Serious injuries	0	0	0
Minor injuries	0	0	0
None	5	4	9
Total	5	4	9

1.3.Damage to Aircraft

Apart from no.3 wheel assembly there was no damage to aircraft

Figure 1; Photograph showing number 3 wheel assembly

1.4. Other damages

Nil

1.5. Personnel Information

1.5.1. Pilot in Command

The pilot-in-command had a valid airline transport pilot license (ATPL) expiring on 27th July 2020. He was rated on PA34 and Dash 8-300. He had a total of 2730.06 hours.

1.5.2. First Officer

The first officer had a valid ATPL expiring on 20th October, 2020. She had a total of 509 hours with a rating on C172 and Dash 8-300 type of aircraft (15th October 2019).

1.6. Aircraft Information

1.6.1. General Information

According to the records obtained from KCAA, the aircraft (DHC 8-311) serial number 406 was manufactured in 1995 and was issued with certificate of registration on 18th November 2016. It was owned by Aero-century Corporation 1440 Chapin Ave Burlingame California USA and was under lease agreement with Silverstone Air Services. It had a valid certificate of airworthiness.

1.6.2. Maintenance History

Records obtained from the company indicated that on 24th September, 2019, the main landing gear assembly was visually inspected and lubrication carried out as required. Additionally, general external visual inspection of the main landing gear yoke and attachment were carried out. Inspection on the nose landing gear was also inspected and lubrication was carried out as required. External general visual inspection of the nose landing gear shock and drag brake was carried out and lubrication of the main landing gear retraction actuator was done. Visual inspection of the

auxiliary actuator, main landing gear stabilizer strut and actuator, up-lock actuator, nose landing gear retraction actuator and check of the landing gear warning light was carried out.

According to KCAA Advisory Circular No. CAA-AC-AWS009C, Aircraft Maintenance, paragraph 3.3.1(m), an AMO shall have an approved maintenance program for overhaul and repair of engine, propeller and appliances whether scheduled or unscheduled independent from maintenances performed on the aircraft. Paragraph 3.3.1(m)(ii) notes that the inspection, check list or task cards shall have provision for the mechanic and authorized engineers signature to certify completion of the task.

On 22nd October, 2019 routine maintenance was carried as KCAA Advisory Circular No. CAA-AC-AWS009C paragraph 3.3.1(m)(ii) in which the hydraulic system fluid level was checked and replenished as required. The nose landing gear tire pressure was checked, visual inspection of the main landing gear tire/wheel assembly carried out and the tire pressure checked. Visual inspections of the nose landing gear wheel assembly and main landing brake assembly wear indicators were all carried out. ADC system (self-test) operation check was also carried out. All the tasks were certified by an authorized engineer. The turn-around time (TAT) reading was 33560.5 hours and Tach time (TAC) reading was 52200 hours.

1.7. Meteorological Information

Visibility was more than 10km, temperature and dew point was 24/13 °C, and wind was calm

1.8 Aids to Navigation

Not applicable

1.9 Communication

The aircraft was equipped with VHF radio and there was two-way radio communication between the pilot and air traffic control and other traffic as witnessed in section 1.1 above.

1.10. Aerodrome Information

Lodwar Airport (HKLO) is located at latitude N 03° 07.300' E 035° 36.500' at an elevation of 1680 feet amsl. The airport has one asphalt runways 08/26 (950 ×17 m) and has no air traffic control.

Eldoret International Airport (HKEL) is located at latitude N 00° 24.250' and longitude E 035° 13.430' at an elevation of 6847 feet amsl. The airport has one asphalt runways 08/26 (3500 × 45 M). The airport is operational daily from 0330 to 1730 hours. The aerodrome has two weekly scheduled International cargo flights and several ad hoc freighters.

1.11 Flight Recorders

N/A

1.12. Wreckage and Impact Information

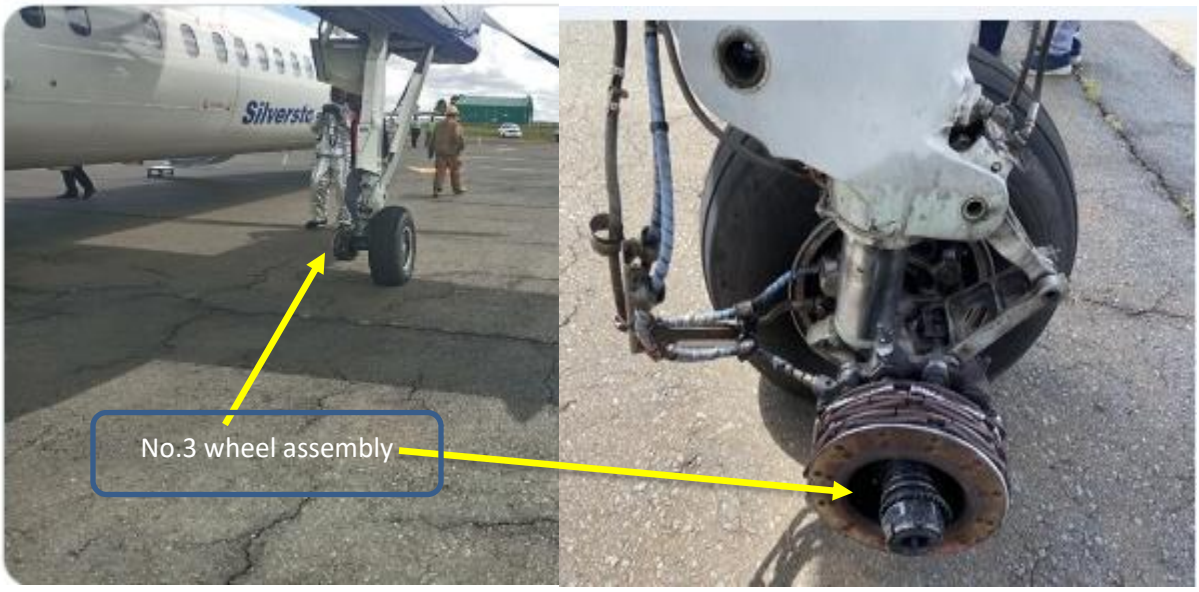

Figure 2: Photograph showing the aircraft and the number 3 wheel assembly

The number 3 wheel on the main landing gear detached from the axle and fell to the ground. The cone of the tapered rolling bearings was recovered on the axle with the rolling elements and ball

cage missing. The aircraft remained generally intact except the no. 3 wheel and parts of the assembly that was missing.

Initial inspection of the assembly found remains of the two bearings on the landing gear axle, the brake assembly was also still attached, and the axle nut and the attaching bolts were also still attached to the axle. What was missing was the wheel assembly and its wheel cup.

Other parts were removed to enable further inspection, the surface were cleaned and inspections carried out. The finding indicated that the axle did not sustain any visible damage both internally and externally. The brake assembly had minor scratches no broken parts and was serviceable and the wheel transducer sustained no damage. The entire airframe and wheel well had no visible damage

Figure 3: Photograph showing cone bearings on number 3 wheel assembly

Figure 4: Photograph showing axle nut on number 3 wheel assembly.

1.13 Medical and Pathological Information

Not applicable

1.14 Fire

There was no fire after landing.

1.15. Survival Aspects

The incident was survivable after the aircraft landed safely.

1.16. Tests and Research.

Not applicable

1.17. Organization Information

1.17.1 Silverstone Air Services

Silverstone Air Services is a commercial airline owned and operated by Kenyans. It was formed and operated on 2017. It operated domestic scheduled, charter and cargo flights inside Kenya. The scheduled flights are available to Kisumu, Mombasa, Lamu, Eldoret, Malindi, Lodwar and Ukunda. By the time of the accident the airline had a valid certificate of air operation and approved maintenance organization by KCAA.

On 19 September, a Fokker 50 (5Y-MHT) after take-off at Mogadishu, the aircraft returned to the Aden Adde International Airport in Mogadishu for an emergency landing. During that landing, the aircraft veered off the runway and impacted a perimeter wall.

On 28 October 2019, a Dash 8-300, registration 5Y-BWG, operated by Silverstone Air, lost its rear-right wheel assembly on take-off from HKLO, with four passengers and five crew members on board. Originally destined for Wilson Airport in Nairobi, the flight was diverted to Eldoret International Airport, where it made a safe emergency landing. The detached wheel assembly was recovered by the public outside HKLO, in Turkana County.

As a result of a safety audit by the Kenya Civil Aviation Authority following these two accidents, the airline was ordered on 12 November 2019 by the Kenyan Civil Aviation Authority to suspend operations with the Dash 8 for seven days

1.17.2. Collins Aerospace Engineering

The investigation obtained the bearing components which were presented to Collins Aerospace Engineering, the landings system manufacturer for analysis. After examination of the components, they deduced that the axle nut was not manufactured by Collins and were unable to analyze it and concluded that there was nothing to learn from it. Secondly, since the investigation had not

provided only the cone components without rollers again they deduced that there was no much to learn from the components.

1.18 Additional Information.

N/A

1.19 Useful or Effective Investigation Techniques

Not applicable

2. ANALYSIS

Looking at the aircraft routine maintenance work sheet provided by the airline, it was evident that the aircraft had undergone a recent maintenance program in which the wheel assembly was inspected and certified.

There was no major incident reported on hard landing between 22nd October 2019 and 28th October, 2019 which could have caused significant damage to the wheel assembly.

Initial site inspection after the incident indicated that the axle did not sustain any visible damage both internally and externally, the brake assembly had minor scratches no broken parts and was serviceable, the wheel transducer sustained no damage and the entire airframe and wheel well had no visible damage.

Consultation with Collins Aerospace Engineering who are landing system manufacturer failed to analyze the bearings because rollers were missing.

3. CONCLUSIONS

3.1. Findings

3.1.1. The pilots had a valid commercial pilot license.

3.1.2. The aircraft had a valid certificate of airworthiness

3.1.3. Silverstone had a valid certificate of air operator and approved maintenance organization

3.1.4. The aircraft had undergone a routine maintenance program as required by KCAA

3.1.5. There was no major incident reported regarding hard landing which could have damaged the wheel assembly since inspection

3.1.6. There was no damage to aircraft

3.2 Probable Cause

The probable cause of the serious incident was likely failure of one or both bearing on the number three-wheel assembly.

4. SAFETY RECOMMENDATIONS

4.1. Silverstone review its safety management systems on aircraft maintenance

Martyn Lunani

CHIEF INVESTIGATOR OF ACCIDENTS

MAY 2023