LIMITED SERIOUS INCIDENT INVESTIGATION REPORT

Reference Number	CA18/3/2/1381										
Classification	Serious Incident		**Date**	20 October 2021		**Time**	1100Z				
Type of Operation	General Aviation and Operating Flight Rules (Part 91)										
Location											
Place of Departure	Upington International Airport (FAUP), Northern Cape province			Place of Intended Landing			Oranjemund International Airport (FYOG), Namibia				
Place of Accident	17 nautical miles (nm) west of FAUP, Northern Cape Province										
GPS Co-ordinates	Latitude	S 28° 25’ 20”		Longitude	E 20° 56’ 33”		Elevation	3525 ft			
Aircraft Information											
Registration	ZS-HNB										
Make/Model	Bell 412 EP (Serial Number: 36317)										
Damage to Aircraft	None			Total Aircraft Hours			13 008.2				
Pilot-in-command											
Licence Valid	Yes		Gender		Male		Age	31			
Licence Type	Airline Transport Pilot Licence (Helicopter)										
Total Hours on Type	145.0			Total Flying Hours			6 345.0				
People On-board	1 + 2	Injuries	0	Fatalities	0		Other (On Ground)	0			
What Happened											

On 20 October 2021, a pilot and two crew members on-board a Bell 412 EP helicopter with registration ZS-HNB were on an international ferry flight from Upington International Airport (FAUP) in South Africa to Oranjemund International Airport (FYOG) in Namibia. The final destination for the ferry flight was intended to be N’djili/Kinshasa International Airport (FZAA) in the Democratic Republic of Congo where the helicopter was to operate. The flight was conducted during visual meteorological conditions (VMC) in day light and under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot stated that they were 10 minutes into the flight with all doors closed when the aft left cargo door window detached from its frame. The pilot further stated that it was a sudden event, with no pre-warning indication to the crew. The pilot immediately descended to the approximate area where the window had fallen to see if they can locate it, but they were unable to locate it. They then returned to FAUP. The helicopter landed back at FAUP without any further damage. The

helicopter sustained no damage other than the window that detached from the helicopter. None of the occupants were injured during the incident sequence.

Figure 1: The left rear cargo door with no window. (Source: Operator)

What was found:

Pre-incident inspection:

- The last maintenance inspection carried out on the helicopter prior to the serious incident was a 5-year/5000-hour maintenance that commenced on 6 May 2021 and was certified on 30 September 2021 at 13 003.7 airframe hours. The helicopter was issued a Certificate of Release to Service (CRS) on 30 September 2021 with an expiry date of 30 September 2022 or at 300 hours of flight time, whichever occurs first.
- Part of the 5-year/5000-hour service included the installation of new helicopter windows. The Aircraft Maintenance Organisation (AMO) installed Parts Manufacturer Approval (PMA) windows that were fitted according to the installation instructions and that were FAA approved under STC No. SH3316SO.

Post-incident inspection:

- Technical Bulletin No. 412-86-54 states:

> DESCRIPTION:
>
> Several reports have been received of inflight loss of windows installed with an elastomeric retainer. The investigation indicated improper bonding of retainer to window frame was the primary cause of window loss. Improper fit of window to window frame opening may be a contributing cause. In most cases of inflight loss of windows occurred within 15 hours of window installation.

- The helicopter had flown 4.5 hours since the installation of the window.
- The window frame was inspected, and the retainer seal and filler seal had remained in place; not due to improper bonding.
- The PMA window that was installed was thinner and more flexible than the Original Equipment Manufacturer (OEM) window. The OEM windows were 0.150 inch thick whilst the PMA window was 0.125 inch thick.
- Technical Bulletin No. 412-86-54 states:

> d. Inspect window (7) for chamfered, nicked or notched edge, cracking, crazing or reduced transparency. Replace damaged windows.
>
> NOTE: Window must be a minimum of .119 inch thick.

- The window that was installed was within the minimum thickness specifications but was thinner than the OEM windows.

Probable cause:

It is likely that the installed window was thinner and more flexible than the OEM part and, most probably, detached from the door structure during cruise due to helicopter vibration.

Safety Action

The operator had since taken a decision to install all the windows for their entire fleet with OEM approved parts.

Safety Message and/or Safety Recommendation/s

None.

Purpose of the Investigation

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and ***not to apportion blame or liability****.*

About this Report
Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar accident. *This report provides an opportunity to share safety message/s in the absence of an investigation.* *All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.*
Disclaimer
This report is produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa