

## SERIOUS INCIDENT

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|--|--|-------------------|
| <b>Aircraft Type and Registration:</b> | Pierre Robin R2160, G-BLWY   |                   |
| <b>No &amp; Type of Engines:</b>       | 1 Lycoming O-320-D2A piston engine   |                   |
| <b>Year of Manufacture:</b>            | 1980 (Serial no: 176)  |                   |
| <b>Date &amp; Time (UTC):</b>          | 16 April 2023 at 1530 hrs  |                   |
| <b>Location:</b>                       | Deenethorpe Airfield, Northamptonshire   |                   |
| <b>Type of Flight:</b>                 | Training   |                   |
| <b>Persons on Board:</b>               | Crew - 2   | Passengers - None |
| <b>Injuries:</b>                       | Crew - None  | Passengers - N/A  |
| <b>Nature of Damage:</b>               | Transparent panel over the rear area of the cockpit detached. Slight damage to the right flap and wing |                   |
| <b>Commander's Licence:</b>            | Commercial Pilot's Licence   |                   |
| <b>Commander's Age:</b>                | 48 years   |                   |
| <b>Commander's Flying Experience:</b>  | 2,685 hours (of which 2,325 were on type)<br>Last 90 days - 115 hours<br>Last 28 days - 50 hours       |                   |
| <b>Information Source:</b>             | Aircraft Accident Report Form submitted by the pilot and further enquiries made by the AAIB            |                   |

### Synopsis

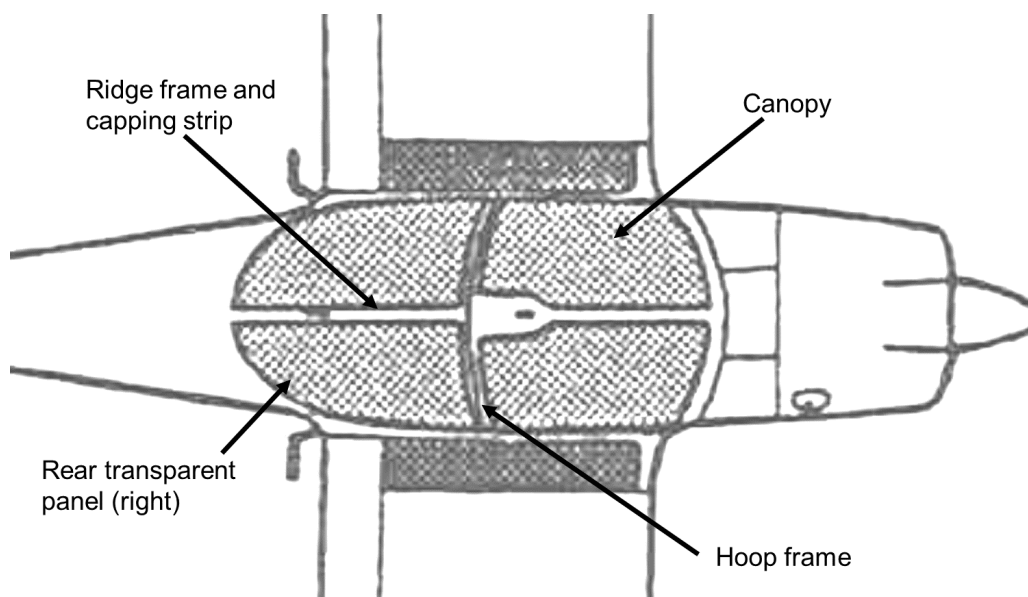
During an aerobatic training flight, a transparent panel over the rear area of the cockpit detached and fell away. The aircraft landed without further incident. The panel detached due to its leading edge dis-bonding from its support frame, allowing the airflow to get under this edge and cause the panel to fail.

### History of the flight

The aircraft was on an aerobatic training flight over open countryside. A clearing turn was carried out at 100 kt and about 60° angle of bank when the transparent panel over the rear right-side of the cockpit detached and fell away from the aircraft. The aircraft returned to the airfield without further incident. Both occupants were uninjured, but the aircraft sustained minor damage on the right wing, flap and rear fuselage.

### Aircraft examination

There are two (left and right) transparent panels over the rear area of the cockpit which extend from the edge of the fuselage to a central ridge frame (Figure 1).



**Figure 1**

Cockpit transparent panels and associated structure

The panels are bonded to the fuselage structure and supporting framework by a sealing adhesive. In addition, a line of screws along the side and rear edge of the panel secures the panel to the fuselage. A capping strip, held in place by screws, is fitted over the edges of each panel where they attach to the ridge frame.

The panel had broken away leaving jagged edged pieces of the panel attached to the side, rear and ridge frames; the screws and adhesive bond were still in place. The leading edge of the panel, where it attaches to a hoop frame just behind the seats (Figure 2) appears to have dis-bonded completely from the frame. It also appears to have taken parts of the canopy weather seal with it. A narrow bead of the adhesive sealant remained on the hoop frame. Examination of the left transparent panel found the bond along the hoop frame had started to come apart and could be lifted under finger pressure.

### Probable cause

Although it is not fully clear what initiated the detachment of the panel, it is likely that the bond on part of the leading edge, where it attaches to the hoop frame, had failed. The upward force on the panel in flight was sufficient to open a gap and allow the airflow to pass between the frame and panel causing it to break.

It is known that polymethyl methacrylate<sup>1</sup> (PMMA) materials such as used in the panel do not tolerate adverse loads which can induce flexing or distortion from their preformed shape. This often results in the material rapidly cracking along rigidly held edges and breaking apart, which in this event can be seen by the remaining jagged panel pieces trapped under the screws.

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### Footnote

<sup>1</sup> PMMA is more commonly known by trademarks such as Perspex and Plexiglas.



**Figure 2**  
Dis-bonded area and canopy seal on the hoop frame