

**Aviation Safety Investigation Report
198902600**

Facet Opal

12 May 1989

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NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

Occurrence Number: 198902600 **Occurrence Type:** Accident

Location: 1 km N Doyalson NSW

Date: 12 May 1989 **Time:** 1615

Highest Injury Level: Fatal

Injuries:

	Fatal	Serious	Minor	None
Crew	1	0	0	0
Ground	0	0	0	-
Passenger	0	0	0	0
Total	1	0	0	0

Aircraft Details: Facet Opal

Registration: 10-0004

Serial Number: N/A

Operation Type: Sports Aviation

Damage Level: Destroyed

Departure Point: Tyagarah NSW

Departure Time: 1315

Destination: Warnervale NSW

Approved for Release: 10th February 1992

Circumstances:

The Facet Opal ultralight aircraft was of a tailless, flying wing design. This unique aircraft was designed, constructed and operated under the provisions of Civil Aviation Orders, Part 95, Section 95.10. The aircraft arrived in the Lake Munmorah area after completion of the 300 nm flight at an average ground speed of about 100 knots. Upon arrival, the aircraft was observed to circle near Norahville and Lake Munmorah to alert relatives of the pilot's arrival. The aircraft took up a SW heading near Doyalson at the completion of the orbit. Witnesses reported sighting the aircraft at about 300 ft agl, and travelling at about 100 kts. As the aircraft approached the Pacific Highway from the NE, it was observed to enter a level turn to the left. The angle of bank was estimated to be 20°-30°. Almost immediately after the turn was commenced, the aircraft broke into three major sections as a result of structural failure. The wing, which broke into two parts at the centre section, tumbled to earth on a property on the E side of the highway. The cockpit and engine trajectories carried them over the highway, some 200 m beyond the wing ground impact points. The pilot received fatal injuries. One witness reported the aircraft's wing had flapped 'like the wings of a bird' immediately before the in-flight break-up. Weather conditions at the time were reported as overcast at 1500 ft, wind light and variable and visibility in excess of 10 km in fine drizzle. The conditions were suitable for flight under visual flight rules and not conducive to the formation of significant turbulence. It is therefore highly improbable that weather conditions were a factor in this accident. An examination of the wreckage revealed the main carry-through spar had failed in overload from an upward bending force. No evidence was found of any fault in manufacture or of pre-existing deterioration to the spar structure. The aircraft was designed and manufactured for an ultimate strength of approximately 8g+. A level turn of 20°-30° angle of bank would normally apply a loading of 1.06 to 1.16g. The wing was capable of producing aerodynamic loads in excess of 6g at an estimated cruising speed of 100 kts. The witness evidence concerning the flapping of the wings is consistent with the aircraft having entered an oscillating manoeuvre in pitch. Wing loads capable of causing structural failure could be generated in such a

manoeuvre. The evidence indicated the aircraft entered an uncontrollable oscillating pitch manoeuvre during which the aerodynamic loads exceeded the structural strength of the wing. The reason(s) for the onset of such a manoeuvre, and the inability of the pilot to minimise the effects of the oscillation, could not be positively established. However, it is recognised that an aircraft with a tailless flying wing configuration that incorporates no sweepback has little damping in pitch and is therefore susceptible to overcontrolling in pitch.

Significant Factors:

The following factors were considered relevant to the development of the accident

1. For reasons undetermined, the aircraft oscillated severely in pitch.
2. The severity of the oscillation resulted in a structural failure of the main spar of the wing.
3. The pilot encountered circumstances beyond his control.