



Australian Government

Australian Transport Safety Bureau

Safety Advisory Notice

To: Registered operators and maintenance organisations of piston engine aircraft

Number: AO-2022-049-SAN-001

On condition? Replacing O-ring seals before age catches up.

A proactive approach to replacing O-ring seals before they deteriorate to the point of failure, may avoid fluid leakage that on this occasion led to an in-flight, fuel-fed, engine fire.

What happened

On 17 October 2022, at about 1345, the pilot of a Mooney Aircraft Corporation M20J aircraft, registered VH-UDQ, departed Maitland Airport, NSW for a local flight before heading to Luskintyre Airfield, NSW. After the aircraft completed an orbit of the airfield, witnesses reported seeing smoke trailing the aircraft as it descended. VH-UDQ collided with terrain about 330 metres (0.2 NM) short of runway 30 and burst into flames. The aircraft was destroyed. The pilot survived the collision, but later succumbed to injuries associated with the post-impact fire.



Age-affected O-ring seal of fluid carrying fitting with inset image displaying permanent deformation of the seal (Source: ATSB)

Why did it happen

Following the accident, pressure testing of the engine driven fuel pump revealed a fluid leak from the pump outlet fitting that supplied the engine fuel control unit. The ATSB's analysis indicated that the condition of the O-ring sealing the fitting had deteriorated with age, with evidence of loss of pliability, permanent deformation and the presence of surface defects. Examination of aircraft records revealed that the pump had been in service for just over 29 years, and had likely remained undisturbed for maintenance related purposes throughout that period.

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AO-2022-049-SAN-001: A proactive approach to replacing O-ring seals before they deteriorate to the point of failure, may avoid fluid leakage that on this occasion led to an in-flight, fuel-fed, engine compartment fire. The ATSB advises aircraft owners, registered operators and maintenance personnel to consider replacement of the O-ring seals of fluid carrying components, when examination of aircraft records identify components that have remained undisturbed for significant periods of time.

Advisory material published by the Civil Australian Safety Authority differentiates between 'on-condition' and 'fit-until-failure' maintenance principles (Airworthiness Bulletin AWB 02-1) however O-ring seals may not be specifically identified as a sub-set of elastomer type products requiring periodic attention for potential loss of function (AWB 85-004).

Replacing O-ring seals before they deteriorate

Unlike engine hoses and rubber isolation mounts, some elastomers contained in engine compartments may not be readily inspected for signs of deterioration or degradation due to age, during routine engine maintenance. In practice, reliance on the absence of a leak when inspecting an engine may not be a reliable indicator of O-ring serviceability across all engine power settings.

Read more about this ATSB investigation: [In-flight fire and collision with terrain involving Mooney M20J, VH-UDQ, near Luskintyre Airfield, NSW on 17 October 2022](#)

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Australia's national transport safety investigator

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