

SPARKING KNOWLEDGE OF FUEL CHEMISTRY

A paddock landing has highlighted the dangers of spark plug fouling.

In 2018, a Cessna 152 suffered partial power loss, which led to a (safe) paddock landing. While the probable cause of the power loss was carb icing, further investigation found that two rear lower spark plugs were excessively lead fouled. These could have exacerbated the power loss.

Spark plug fouling is associated with the complex chemistry of Avgas fuel. The scavenging additive in the fuel requires high temperatures to convert the tetraethyl lead (TEL) within the fuel to a gas, which can be exhausted overboard.

Vaporisation of the TEL may not be complete when the following conditions exist:

- engine temperatures reduce as a consequence of carb icing
- a low-powered descent
- a rich mixture.

When this occurs, lead deposits can form in the spark plug electrodes. This causes the spark plugs to foul and misfire.

Practical tips

It's critical to establish and maintain appropriate engine operating temperatures to ensure the TEL is properly vaporised and exhausted overboard.

CAA Principal Aviation Examiner David Harrison says "there's plenty of guidance on the handling of carb icing and the correct procedures for engine leaning. You can find this in theory syllabuses, practical teaching through flight training, and in aircraft flight manuals.

"However, if you're ever unsure, seek the advice of an instructor – there's no such thing as a dumb question in aviation."

Shell's website also offers interesting background information about preventing lead fouling and other details about spark plugs.

Visit www.shell.com, "Business customers > Aviation > AeroShell Aviation Lubricants > Aeroshell Knowledge Centre > Technical talk".

More information

- The defect report relating to the 2018 incident, 18/6705, can be read in "GA defects" on page 27.
- Refer to the CAA's *Aircraft Icing Handbook* for more information on carburettor icing. Visit www.caa.govt.nz, "Safety Info > Publications".
- Australia's Civil Aviation Safety Authority (CASA) has a helpful carburettor icing probability chart. This can be found through an internet search. ➔

SECTOR RISK PROFILE UPDATE

Sector risk profiles assist an aviation operator to identify potential risks and their severity. The operator can then decide which risks apply to their business, and mitigate them.

The profiles are dynamic, and are reviewed and updated. To this end, there were workshops in March 2019 to discuss and refine two SRPs:

- Part 121, 125, 129, and ANZA Medium and Large Aircraft Air Transport SRP, developed in 2017

- Part 135 Helicopter and Small Aeroplane Operations SRP, developed in 2018.

The workshops reviewed five of the risks for each sector. Participants shared controls they were using to manage and mitigate risks, and any barriers to safety improvements they had identified. The other risks still need to be considered.

The SRP reports have been updated as a result of the workshops, visit www.caa.govt.nz/srp.

The SRP reports are valuable resources assisting aviation operators to comply with:

- Civil Aviation Act 1990
- SMS requirements
- Health and Safety at Work Act 2015.

The CAA will also use the SRPs to apply resources to areas contributing to safety risk. ➔