

# AWB 79-1 Issue 1, Spectrographic Oil Analysis Program (SOAP)

Spectrographic Oil Analysis Program (SOAP)

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## Applicability

To all owners, operators and maintainers of piston and turbine engines.

## Background

The periodic analysis of oil samples taken from a machine in service, such as an aircraft engine, can be a valuable condition-monitoring tool. Spectrometric oil analysis programs (SOAP) can provide an early warning of abnormal wear occurring, not only from internal distress such as a failing bearing, but also external factors such as operating in a dusty environment without adequate filtering of intake air.

## Recommendations

As such, CASA supports and recommends aircraft operators consider including SOAP as part of the engine maintenance schedule. However, CASA does not mandate the monitoring of engines by SOAP unless SOAP is included in the aircraft operator's elected maintenance schedule. For example, a number of turbine engine manufacturers mandate SOAP in certain turbine engine maintenance schedules.

There are a number of reasons why CASA, and other regulatory authorities, do not mandate SOAP.

## Applicability

To be effective, SOAP must be carried out in accordance with a detailed procedure. That procedure must detail samples being taken at regular intervals, from the same position within the engine and analysed by the same laboratory.

1. SOAP is ineffective if one sample is taken from the middle level of the oil tank/sump and then the next is taken from the filler neck after adding fresh oil.
2. Laboratories analysing SOAP samples can each provide widely variable results from the same oil sample. Shopping around for the best price at each sample period will result in trend reports that make

no sense. This then makes the program ineffective.

## Trend Analysis

A SOAP program starts with the first sample being taken, preferably early in the engine life. The results obtained from the first sample become the baseline. Subsequent sample results are then compared to that baseline. For example; after a suitable running in period, a piston engine would typically have an iron material level base line of around 5 to 10 parts per million (ppm) material concentration. A sample showing an increase in iron material from 8 ppm to 40 ppm could therefore be a warning of impending failure. Maintenance action is then required.

## Cost

SOAP programs costs vary considerably. Some oil companies use to provide SOAP free to contracted customers. Some aircraft and turbine engine manufacturer's include SOAP in their maintenance program costs. Alternatively, the operator will be required to meet the cost as with other maintenance actions.

## Summary

In summary, SOAP is a maintenance planning tool rather than a real time safety indicator. SOAP, if not managed effectively, can result in the aircraft operator being provided with information, and further maintenance actions will be required as a result of any indication. CASA does not mandate SOAP, unless detailed in the operator's elected maintenance schedule.

## Enquiries

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