



Contribution ID: 44

Type: **not specified**

Statistical Diagnostics of Turboprop Engines Condition

Tuesday, 12 September 2023 09:40 (20 minutes)

Modern digital instruments and SW options are standardly used in various areas, of course also in aviation. Today, the pilot is shown a number of physical parameters of the flight, the state of the propulsion or the aircraft's systems. These instruments also automatically save the scanned data.

Analysis of collected data allows simultaneous surveillance of several aircraft turboprop engines related variables during each flight. Data collection and subsequent continuous evaluation promise early detection of incipient damage or a fouling before the regularly planned inspections. This fact could prolong the service intervals and extend the engine Time Between Overhauls (TBO).

Due to the complexity of the dependencies among the acquired engine parameters, various operation conditions (atmospheric pressure, temperature, humidity) and flight profiles, conventional statistical process control procedures are not suitable for the diagnostics. In the paper, a methodology for identification of the changes in engine condition based on regression analysis methods is proposed. The results for a thousand flight records are presented and discussed as well.

Keywords

Turboprop, Trend monitoring, Diagnostics

Classification

Both methodology and application

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Session Classification: CONTRIBUTED Industry

Track Classification: Industry