

Reliability and Maintainability Optimization for Aircraft's Repairable Components Based on Cost Modeling Approach

Authors : Adel A. Ghobbar

Abstract : The airline industry is continuously challenging how to safely increase the service life of the aircraft with limited maintenance budgets. Operators are looking for the most qualified maintenance providers of aircraft components, offering the finest customer service. Component owner and maintenance provider is offering an Abacus agreement (Aircraft Component Leasing) to increase the efficiency and productivity of the customer service. To increase the customer service, the current focus on No Fault Found (NFF) units must change into the focus on Early Failure (EF) units. Since the effect of EF units has a significant impact on customer satisfaction, this needs to increase the reliability of EF units at minimal cost, which leads to the goal of this paper. By identifying the reliability of early failure (EF) units with regards to No Fault Found (NFF) units, in particular, the root cause analysis with an integrated cost analysis of EF units with the use of a failure mode analysis tool and a cost model, there will be a set of EF maintenance improvements. The data used for the investigation of the EF units will be obtained from the Pentagon system, an Enterprise Resource Planning (ERP) system used by Fokker Services. The Pentagon system monitors components, which needs to be repaired from Fokker aircraft owners, Abacus exchange pool, and commercial customers. The data will be selected on several criteria's: time span, failure rate, and cost driver. When the selected data has been acquired, the failure mode and root cause analysis of EF units are initiated. The failure analysis approach tool was implemented, resulting in the proposed failure solution of EF. This will lead to specific EF maintenance improvements, which can be set-up to decrease the EF units and, as a result of this, increasing the reliability. The investigated EFs, between the time period over ten years, showed to have a significant reliability impact of 32% on the total of 23339 unscheduled failures. Since the EFs encloses almost one-third of the entire population.

Keywords : supportability, no fault found, FMEA, early failure, availability, operational reliability, predictive model

Conference Title : ICRM 2019 : International Conference on Reliability and Maintainability

Conference Location : Barcelona, Spain

Conference Dates : August 15-16, 2019