

Cost Reduction in Aircraft Hydraulic Actuators through VAVE Techniques



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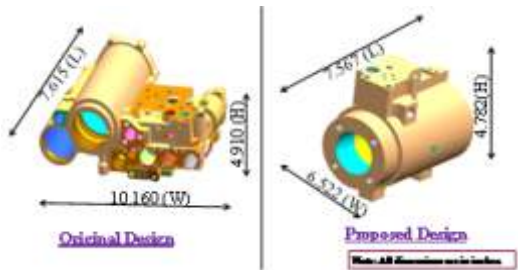
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Abstract:
In today's global Aircraft business scenario companies are facing more competition in the market for survival. Manufacturing high quality products with low cost will facilitate in achieving competitive edge to the organization. Companies need to continuously improve quality of their products and services in addition to cost reduction. To achieve this Value Analysis and Value Engineering tools are widely used globally.

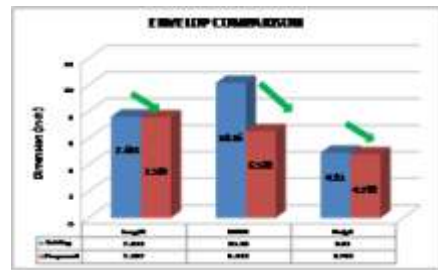
In the present study, Aircraft Hydraulic Actuator was considered for reduction of cost and possibility of introducing common components through standardisation to reduce the number of variants. The primary goal was to arrive at an actuator design that can be used for business jet aircraft primary flight controls, with lower recurring and non-recurring costs than the current generation of flight control actuators manufactured by Moog. Value Engineering and tools were used for achieving the above objective. Construction and functions of each subcomponent was studied in detail and "Actuator Housing" part was chosen for reengineering. It was found that the actuator Housing alone was contributing 43% weight compared to other parts of the actuator. This housing part accommodates all the functional components and electrical connectors.

Alternative materials were compared to reduce the weight of the actuator housing using function cost worth analysis. It was found that existing material Al 7050 T74511 was appropriate. Further, the actuator assembly was studied for possible elimination of redundant parts without compromising the basic function. The standardization of housing resulted in reduction of assembly time by 60 min, moreover 4 different stall loads and working strokes were achieved through use of replaceable sleeves and glands in same housing. The proposed alternative design enabled the cost benefit of 34.18%.

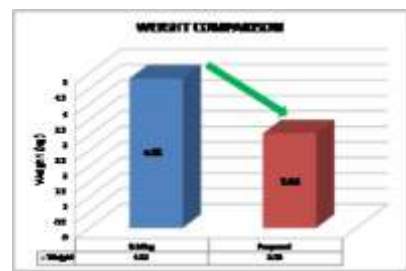
New design was validated through FEA for operating condition. Prototype was assembled and tested as per Moog standard procedure.



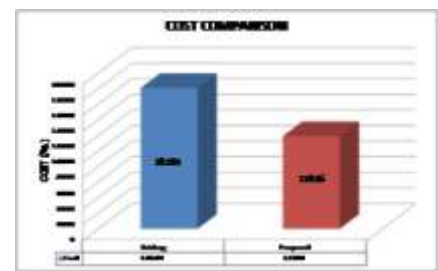
Comparison of existing and proposed housing model



Bar chart- envelop comparison



Bar chart- weight comparison



Bar chart- cost comparison