

Airframe Usage Analysis of C-130 Aircraft Used in Aerial Firefighting Missions

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United States Forest Service (USFS) uses various types of aircraft to manage wildfires; these include helicopters, scoopers, single-engine airtankers (SEATs), large airtankers (LATs), and very large airtankers (VLATs). Among the LATs are two variants of C-130 aircraft, the EC-130Q and L-382G. In this study, recorded flight data from two EC-130Q and two L-382G aircraft were analyzed to perform operational airframe usage assessment. These aircraft were flown in support of USFS aerial firefighting missions during 2016 through 2019 for a total of 1,354 flights, which accounted for approximately 882 hours of flight time. For analysis, flights were divided into two types; firefighting and ferry/maintenance flights. Aircraft usage information regarding maximum altitude, maximum indicated airspeed, and vertical load factors is presented and compared between the two types of flights. It was shown that the aircraft were largely flown within the operational limits. The aircraft analyzed in this study were modified to operate in an environment for which they were not originally designed. The ferry flights were most similar to those for which the aircraft were designed. A comparison was done between the ferry/maintenance and firefighting flights to show the differences in the airframe usage. Results of this study will help the operators determine how the current usage differs from that for which the aircraft was originally designed. Inspection and maintenance programs may then be adjusted in order to take the USFS usage into consideration.