AIAA 81-4235

Predicted Airframe Noise Levels for Certification Flights

P. J. W. Block*
NASA Langley Research Center, Hampton, Va.

Introduction

A RECENT publication by the author[1] evaluated the ICAO reference method for airframe noise prediction. The ICAO method, which was developed by Fink,[2] was used to predict approach noise levels in terms of EPNL of several aircraft. These predicted airframe noise levels were compared with certification data of selected commercial aircraft and with current FAA stage 3 (1977) noise regulations. Comparisons with certification data and with FAA certification requirements created an inconsistency in the last figure of Ref. 1 in that the predicted noise levels were for approach velocities lower than required for certification. This inconsistency will be corrected in this Note.

Corrected Computations of Airframe Noise Levels

The values for aircraft approach speeds and flap settings used in the last figure (Fig. 13) of Ref. 1 are given in Table 1. These values are typical for normal operations of these aircraft but are not the same values required for certification flights. The certification values are also given in Table 1. The certification velocities are higher than the typical approach velocities and this results in higher predicted airframe noise levels. The predicted airframe noise levels have been recalculated using the certification values and are listed along with the previous calculations in Table 2. The predicted airframe noise levels under certification conditions average 2.3 dB higher than those calculated using the typical approach values.

The new levels are replotted in Fig. 1 of this Note and represent a consistent comparison with certification requirements. Predicted levels for Space Shuttle Orbiter, Spanloader, LFC, and AST-100 aircraft are not recalculated for Fig. 1 of this Note since certification velocities have not been established for these aircraft.

For further discussion of the more controversial aspects of this prediction procedure together with numerical predictions resulting from a modified method, the reader is referred to Ref. 3.

Table 1 Input values for airframe noise prediction

Aircraft	Typical approach values (used in Ref. 1) Velocity, m/s	Flaps, deg	Certification values Velocity, m/s	Flaps, deg
DC-9-30	64.43	45	73.6	40
727-200	64.84	45	71.55	40
A300-B2	67.94	45	83.50	25
L-1011	73.34	45	77.16	42
DC-10-10	70.64	45	77.16	50
747-200B	72.44	45	85.14	30

Received Oct. 6, 1980; revision received March 12, 1981. This paper is declared a work of the U. S. Government and therefore is in the public domain.

*Aerospace Engineer.

Table 2 Airframe noise prediction for approach EPNL

Aircraft	Predicted levels from Ref. 1, EPNdB	Predicted levels using certification values, EPNdB	Difference from original calculation EPNdB
DC-9-30	84.3	87.2	+2.9
727-200	91.9	93.6	+1.7
A300-B2	88.5	91.8	+3.3
L-1011	90.2	91.2	+1.0
DC-10-10	90.3	92.8	+2.5
747-200B	97.5	99.6	+2.1

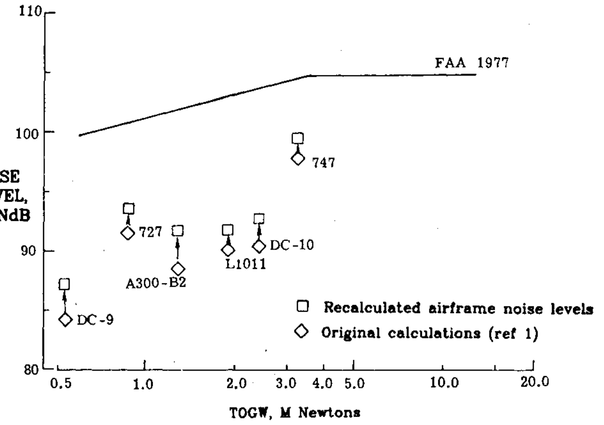

Fig. 1 Predicted landing airframe noise levels for certification flights.

References

[1] Block, P. J. W., "Assessment of Airframe Noise," *Journal of Aircraft*, Vol. 16, Dec. 1979, pp. 834-841.

[2] Fink, M. R., "Airframe Noise Prediction Method," Federal Aviation Administration Rept. FAA-RD-77-29, March 1977.

[3] Raney, J. P., "Predicted Airframe Noise Levels," NASA TM 81849, Sept. 1980.

AIAA 81-4236

Effect of Leading-Edge Vortex Flaps on Aerodynamic Performance of Delta Wings

C. Subba Reddy*
Old Dominion University, Norfolk, Va.

Nomenclature

A	= aspect ratio
b	= wing span
$\bar{c}$	= aerodynamic mean chord
c_r	= root chord
C_D	= drag coefficient
C_L	= lift coefficient

Received February 11, 1981; revision received May 19, 1981.
Copyright © American Institute of Aeronautics and Astronautics, Inc., 1981. All rights reserved.

*Assistant Professor, Department of Mechanical Engineering and Mechanics.