DEPARTMENT OF AUTOMOTIVE AND AERONAUTICAL ENGINEERING

Wake Turbulence Reclassification and Separation with Induced Power Using the FAA Aircraft Characteristics Database

Task for a *Project*

Background

Aircraft produce wake turbulence or wake vortex turbulence. The whole topic is covered here with many articles. Depending on their vortex strength, aircraft are put in Wake Turbulence Categories (WTC). The criteria for the categories vary. ICAO goes by aircraft mass and lists aircraft by category. EUROCONTROL goes by aircraft mass and wing span (Figure 6) and also lists aircraft by category (Table 2). Also, the FAA lists aircraft by category (Table A-1). Flight mechanics on the topic can be quite simple. The vortex strength can be calculated with what we call "induced power". I have explained it here. Camilo (2022) has written on "Comparing Aircraft Wake Turbulence Categories with Induced Power Calculation". With help of the FAA Aircraft Characteristics Database (ACD) refinement is possible of own WTCs.

Task

Your task is

- to describe the FAA Aircraft Characteristics Database (FAA ACD),
- to present established wake turbulence classifications by ICAO, Eurocontrol, FAA, and an initial induced power-based HAW WTC,
- to apply the parameters used for ICAO, FAA, and EU classifications to the aircraft types listed in the FAA ACD,
- to calculate induced power during approach based on Camilo (2022), using the available parameters from the FAA Aircraft Characteristics Database for all listed aircraft types,
- to develop a comparable induced power-based WTC, aligned with the category thresholds of RECAT-EU and RECAT-ICAO,
- to derive a formula-based, continuous aircraft separation model based on the separation charts from RECAT-EU and RECAT-ICAO,
- to apply the new formula to exemplary calculations of new separations, and to compare it with other separation charts.

The report has to be written in English based on German or international standards on report writing.