

Fuel Consumption of the 50 Most Used Passenger Aircraft

Task for a *Project*

Background

Fuel consumption of passenger aircraft is certainly known, but for the public it is considered an industry secret. Not for us. A closer look at aircraft performance fundamentals shows ways to determine the fuel consumption. It can be calculated from fundamental equations as well as from statistical equations for glide ratio and specific fuel consumption. Fuel consumption can also be calculated from the slope of the MTOM-line in the payload-range diagram. Fuel consumption can be calculated from an extended payload-range diagram, if MTOM, MZFM, and range at maximum payload (harmonic range) is known. [Burzlaff 2017](#) made an Excel table, from which fuel consumption versus range can be calculated. The consumption at harmonic range can be read from the graph as a representative value. Fuel consumption can also be obtained directly from the EEA Master Emission Calculator, from BADA (older public data), or from a conventional literature review. A new idea is to calculate fuel consumption (backwards) from the CO₂ Metric Value (although the MV was conceived in such a way to make this rather impossible). It is only necessary to estimate the cabin floor area of the aircraft in question. Take the 50 most used passenger aircraft from [Hurtecant 2021](#) to get going.

Task

This project defines fuel consumption for passenger aircraft, shows and evaluates methods and databases for its calculation, and lists the fuel consumption of the 50 most-used passenger aircraft. Input data is only from publicly available documents. The subtasks of your thesis are:

- Make a Systematic Literature Review (SLR) on the topic.
- Select one of the many definitions for fuel consumption and explain your choice.
- Explain the methods to calculate fuel consumption.
- Introduce the data sources to determine fuel consumption directly (EEA, BADA) or the data sources that obtain the parameters to calculate fuel consumption (Aircraft Characteristics for Airport Planning, EASA Aeroplane CO₂ Emissions Database)

- Analyze your fuel consumption data by looking at average values, the coefficient of variation, the coefficients of determination, the mean absolute percentage error, take your matrix of coefficients of determination as a Design Structure Matrix (DSM) and analyze the DSM.
- Analyze and interpret the fuel consumption data for all your aircraft in a systematic way.
- Describe your Excel tool.
- List the fuel consumption data in Excel and HTML on the WWW.

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