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Data Article

Dataset on statistical analysis of jet A-1 fuel laboratory properties for on-spec into-plane operations

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ABSTRACT

Safety is of utmost essence in the aviation sector, both on-ground and in the air. Aviation Turbine Kerosene (ATK) commonly referred to as jet fuel is one of the major resources of the aviation sector, contributing significantly to the operating cost of an airline. Flight safety is a top-notch requirement in air transportation management. Jet fuel quality affects flight safety, and this makes it mandatory to ensure that, at all points in the jet A-1 aviation fuel supply chain, the jet fuel is contamination free and on-spec. Jet fuel quality is determined via various mandatory Joint Inspection Group (JIG) based quality analysis test procedures; both baseline and extensive lab tests by third party labs. Acceptable parameter range has been established for each jet fuel property, the electrical conductivity of jet A-1 fuel must be between 50 and 600 pS/m and the density at 15 °C must be between 0.775 and 0.840 g/cm^3. Beyond this range, the fuel is deemed off-spec and unsafe for into-plane fuelling operations. This data article presents daily jet fuel test records for jet-A1 fuel. The dataset contains the date of the test, the conductivity, the specific gravity at ambient temperature, the converted specific gravity at 15 °C, and the temperature of the jet fuel sample under study. All the tests were performed at standard laboratory conditions using approved and certified equipment. The dataset provides an opportunity for developing a predictive model that can be used for jet fuel properties prediction on

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a given day, based on previous data trends and analysis using data pattern recognition, as an indication of the variation of jet fuel properties with daily weather variation.

Specifications Table

Subject area	*Engineering*
More specific subject area	*Petrochemical Engineering, Quality Assurance Engineering, Pattern Recognition*
Type of data	*Tables, figures and spread sheet file*
How data was acquired	*Data acquisition from daily, laboratory standard test logs for jet A-1 fuel. The tests were carried out after daily tank draining using chemical water detector, calibrated and certified thermometer and hydrometer, and fuel conductivity meter*
Data format	*Raw, filtered, analyzed*
Experimental factors	*Data was extracted on four (4) jet fuel test parameters, together with the date of the fuel test; from aviation fuel, standard test records of an into-plane company. Only days with four complete test results were considered.*
Experimental features	*Frequency distributions, Linear regression models and Generalized linear model analysis were performed to illustrate data trends, and to determine the relationship among the test data parameters*
Data source location	*Airfield aviation fuel depot based in Nigeria*
Data accessibility	*The dataset is available in a spreadsheet file attached to this article*

Value of the data

- The dataset presents a detailed Joint Inspection Group (JIG) compliant jet A-1 fuel test results, which shows the variation of jet fuel properties across months in a tropical African country.
- The tables, frequency distribution, and figures presented, provides vital insights on the changes in jet fuel characteristic properties with daily weather variations.
- The data and statistics presented in this data article, with further analysis can be deployed for evolving a very accurate predictive model [1] that is capable of predicting jet fuel properties all through the year. These statistical representations were developed using similar methods to those found in [2].
- Accurate jet fuel properties prediction via data trending analysis, will empower jet fuel depots to proactively prepare sufficiently in terms of quality and procedural requirements to meet any anticipated jet fuel property variation beyond acceptable limits on a given day.
- The availability of this data, will stimulate the collection of similar data for related studies in various regions of the world, and this may trigger further extensive studies and create platforms for collaborative research works on a wider scale, both locally and globally.

1. Data

Aircrafts runs on aviation fuels, which are majorly of two types; Aviation Gasoline (AVGAS) and Aviation Turbine Kerosene (ATK) [3]. The geographical location of a country determines its weather