Data in Brief ∎ (∎∎∎∎) ∎∎∎–∎∎∎

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Q1 Stock keeping accuracy: A data based Q2 investigation of storage tank calibration challenges

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ARTICLE INFO

Article history:
Received 4 April 2018
Accepted 28 June 2018

Keywords:
Oil and fuel
Transportation
Storage tank
Calibration accuracy
Data pattern recognition
Stock Accounting

ABSTRACT

In fuel dispensing and fuel haulage companies, adequate stock tracking is mandatory for performance and business productivity analysis. Stock monitoring is vital for inventory management; it is a tool that enables adequate planning in terms of importation requirements when stock is low and for general price management. The accuracy of stock inventory depends largely on the accuracy of the calibration data of the various storage tanks and structures deployed along the value chain. Mobile tanks are prone to harsh conditions due to poor road networks in some countries which affect tanker truck alignment and suspension systems, and all these affects tank calibration accuracy. This is further aggravated by various road impacts, and accidents that sometimes distort portions of the tank shape making it to lose its cylindrical profile in some sections. Excessive stock variations is often linked to product theft and sabotage, though this may be true in some instances, but at times, this variations may be as a result of inaccuracies in tank calibration. The dataset presented in this paper contains tank calibration parameters for two consecutive calibrations carried out on the same mobile storage tank. The statistical analysis attempts to identify variations between the two tank calibration dataset as an indication of potential stock accuracy variations.

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https://doi.org/10.1016/j.dib.2018.06.122
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Please cite this article as: A. Israel Adekitan, O. Omoruyi, Stock keeping accuracy: A data based investigation of storage tank calibration challenges, Data in Brief (2018), https://doi.org/10.1016/j.dib.2018.06.122

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Specifications Table

Subject area	*Engineering, Stock Accounting*
More specific subject area	*Petrochemical Engineering, Stock keeping, pattern recognition*
Type of data	*Table, graph, figures and spread sheet file*
How data was acquired	*Dataset acquisition from the calibration chart log for a mobile fuel storage tank*
Data format	*Raw, analyzed*
Experimental factors	*Data was extracted on three (3) key tank calibration parameters; the tank dip, the cumulative volume and the volume increment. The data is based on charts for 2 successive tank calibrations performed within a 3-year period*
Experimental features	*Frequency distributions, Linear regression models and Generalized linear model analysis were carried out to identify pattern variations between the two calibration data sets for the same tank*
Data source location	*Fuel haulage company in Nigeria*
Data accessibility	*The dataset is available in a spreadsheet file attached to this article*

Value of the data

- The data set contains fuel storage tank calibration parameters. These are important parameters that are stored on software platforms for automatic computation of fuel stock, and this enables stock reconciliation, product loss tracking and profit accounting.
- The availability of this data, and the analysis presented herewith may stimulate other similar studies not only in academia but also in the industry, in an effort to provide a better understanding of operational factors responsible for significant variations in successive calibration data for the same storage device.
- The tables, frequency distribution, graphs and figures presented, provides vital insights on data trends and variation in tank calibration data for successive calibration exercise.
- Access to this data will provide a platform, and basis for extensive investigation towards developing elaborate data models; both qualitative and quantitative, that will enable the development of an improved stock management system.
- This dataset may serve as an opportunity for collaborative research on related works, both locally and across the globe.

1. Data

Q3 In fuel depot operations, fuels such as diesel, petrol, jet fuel and so forth are transported and distributed by fuel tankers from shore depots to various fuel stations, and dispensing depots in Nigeria [1], so that consumers can have easy access to purchase needed fuel (Premium motor spirit, Kerosene and Automotive Gas Oil). To ensure accountability, as the fuel is transported, various stock keeping and inventory models are usually deployed along the value chain [2]. Typically, the actual volumetric capacity of the mobile tanks are determined using a manual or liquid calibration method to create a standard table to relate the height or depth measured to some volume specific to the tank [3]. Subsequently, a non-reactive paste is applied on a dipping stick or tape, and the stick is lowered into the storage tank to determine the fuel height from the tank base. Using the standard chart already created, the height is converted to fuel volume, and this is documented in the appropriate stock report. The report is periodically submitted to the stock department of the company for

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