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AN ANALYSIS OF AIR POLLUTION FROM HEAVY MOTOR VEHICLES AT DELTA BEVERAGES.

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ABSTRACT

The effects of vehicle exhaust emissions have become an environmental concern due to the rapid increase of the transportation sector. This research provides an overview on the analysis of heavy motor vehicle exhaust emissions, a case study at Delta Beverages Transport Service with 194 trucks transporting goods nationwide. The research presents the results of investigations concerning the relations between the state (age and mileage) of the trucks and the exhaust gas emissions for different makes of heavy motor vehicles which include Nissan, DAF, Mercedes Benz and Scania. The measurements of the test group of 194 trucks were done at three different intervals, after every 4 months from July 2011 – June 2012 using the exhaust gas analyser which measured HC, CO, CO$_2$ and NO$_x$ levels. The measurements were made in accordance to the International Standard ISO 3929 (2003): Road vehicles — Measurement methods for exhaust gas emissions during inspection or maintenance. These measurements provided information about the number of vehicles with high levels of gas emissions. Statistical Analysis System (SAS) software package and Microsoft (MS) Excel were used to analyze the data. Descriptive statistics was used whereby means and tables were used to interpret data. The results of investigations were compared to the standard requirements as prescribed by Environmental management (Atmospheric Pollution Control) Regulations SI 72 of 2009. From the results of the one sample Z-test carried out ($Z>1.645$) meaning that the emission levels were above the permissible standard level as given by the regulation. About 59% of the trucks had emission levels that were above the permissible standard levels as prescribed by EMA. The research offers potential system level solutions and design considerations for integration of efficient and cost-effective exhaust emission control systems. It also contributes towards understanding the enormity of emissions of pollutant substances from vehicles and the effects they may cause to the workers within the workshops. From the research it is evident that the levels of exhaust emissions increase with an increase in mileage and the number of years of the vehicle, with make of the vehicle also contributing to the variations in the levels of the emissions across the fleet. Therefore condition based maintenance must be done in addition to prescribed service after every 15 000km. Pre check tests must also be carried out religiously before truck is released for route. Another recommendation would be considering the purchasing of euro IV vehicles that are more efficient and produce lesser emissions.