I.M.O.D.E

Integrated Monitoring Of Diesel Emissions

DESIGNED AND MANUFACTURED IN CANADA BY THERMAL-LUBE INC.

CASE STUDY

AUTOMATED CONTINUOUS EMISSION MONITORING IN AN ENGINE LOAD BALANCING PROCEDURE

Objective

The objective of this phase of the implementation of **I.M.O.D.E**® onboard ship is to correlate engine power and emission reading using a device as a mean of data entry that will eliminate human interventions, thereby enabling the system to run more efficiently and autonomously.

Concept and Procedure

In order to circumvent problems related to manual data entry, a potentiometer coupled to a data acquisition card (DAQ) was acquired and installed on the governor of the engine. The device was then routed to the **I.M.O.D.E**® computer, where the software collected and processed the data sent by the DAQ. The engine used in this test was a type APE Allen Diesel generator used for power generation onboard ship, burning marine diesel and capable of developing 800 kW power.

Once the calibration curve was generated and all the necessary data extracted and stored in the software, the system was ready for real time emission reading and engine load power recording (kW).

The experiment was conducted on one of a set of three running generators. The load on each generator was balanced with respect to the total power required for the duration of the task and the number of generators running. In this operating condition a variation of load (kW) was observed with time for the generator monitored.

Results

The **I.M.O.D.E**® system was able to accurately monitor the load balancing and recorded a minimum load of 100 kWh and a maximum load of 600 kWh for the length of the operation. Furthermore, the system showed the period of time each load was maintained the time interval of changes hence adding both *in-situ* and post analysis of the power balancing procedure.

The results of the experiment demonstrate that the **I.M.O.D.E**® system can be a powerful tool for measuring and evaluating the environmental impact of marine engine emissions as a function of power generated, and as it is autonomous and continuous, does not require additional operation by the crew.

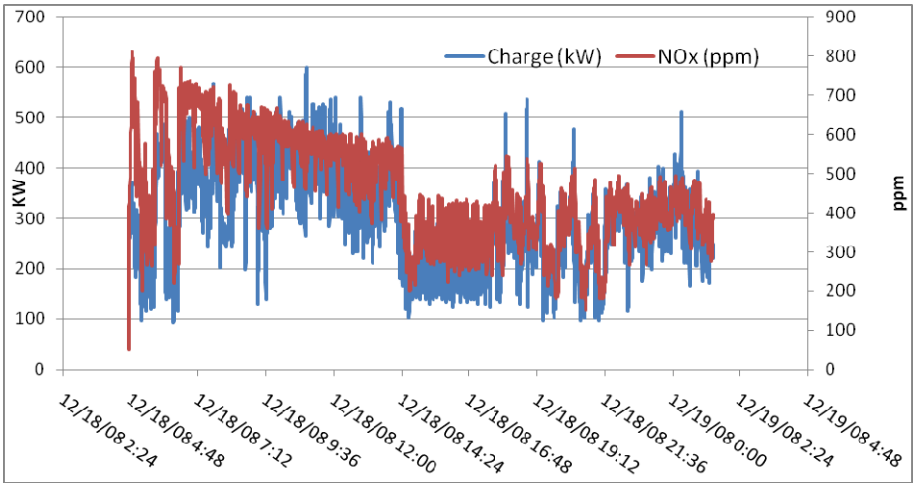

FIGURE 1: *Correlation between engine loads (kW) and NO_x emissions (ppm) over 10 hours of continuous recording*

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