

Monitoring Dredge Barge Engines for Maintenance and Emissions Concerns

DataTaker Solution Helps Keep NY Waterway Open for Business



A considerable amount of the seagoing freight enters the US through New York Harbor, one of the world's largest and busiest. Keeping the harbor navigable is a full-time job that requires constant dredging to allow large oceangoing vessels safe access to the freight terminal. Each of these dredging barges utilizes multiple diesel engines to run its generators to power all other equipment. Dredging operations are overseen by the EPA and the Army Corps of Engineers so it is essential for barge crews to

continually monitor these large engines and record engine parameters to maintain operations and emissions to avoid potential fines for exceeding EPA emission regulations.

In March of 2011 CAS Data Loggers provided the solution for R.A. Mitchell Co. Inc., an emergency generator and marine services dealer. Their customer operates one of these dredge barges and needed "a bulletproof way to get the data," specifying that they wanted all the engine data in one format so workers would only have to use a single process for all their different types of equipment.

To provide continuous monitoring each diesel engine was fitted with a dataTaker DT-80 Data Logger and where appropriate, a CANgate CANbus to Serial Gateway. At a minimum, both run time and fuel consumption are recorded for each engine. When applicable, the dataTaker also monitors engine RPM, engine load and coolant temperatures in order to evaluate engine performance.

On newer engines all of these parameters are typically available from the engine ECU (Engine Control Unit) via the CANbus. For example in the barge's crane cab, a dataTaker DT-80 and CANgate are installed in a control cabinet located near the operator's seat, mounted on a diesel generator and wired to the generator and an engine control unit (ECU). Using the dataTaker CANgate bundled with the DT-80 data logger allows periodic recording of all of the critical engine parameters in real time. Using one of the digital inputs of the data logger wired to a simple oil pressure switch as a trigger allows recording of data only when the engine is actually in operation. Users can flexibly configure the CANgate to choose the signals they want to log at any given time, apply statistical functions (average, min/max), and pick the format in which data is returned then the CANgate passes this data on to the DT-80 for storage.

The older engines that do not have an ECU are monitored using a DT-80 data logger without the CANgate add-on. These engines are simply fitted with sensors monitoring data points that

would normally be available on the CANbus in newer engines. Sensors include magnetic pickups for engine RPM, thermocouples for temperatures, and a flow meter for fuel flow. Utilizing its universal analog inputs and digital inputs (some as high speed counters) allows the DT-80 to record the same data as with the CANgate on the newer engines. The dataTaker data loggers are intelligent making them capable of performing calculations on the data such as total run time, average temperature, and total fuel used. If necessary, an RPM/fuel flow map can also be used to approximate engine load. The DT-80 can also calculate the engine fuel map consisting of all the engine readings from the varying running conditions. This is used in ongoing efforts to optimize engine performance and reduce emissions.

Another driving force behind choosing the DT-80 was the ability to download the data files with a USB thumb drive by inserting it directly into the logger. This makes it easier to download the data from multiple engines once a week in an Excel formatted data file to quickly generate a report summarizing daily operating information. This report is then submitted to the EPA to prove compliance.

The collected data from the dataTaker DT-80 data logger and CANgate allows users to view critical engine parameter during operation. This data is not only used to prove compliance but it also aids in the development of a maintenance program for the machinery extending the life and increasing the profitability of the operation.

To make sure everything ran smoothly for this application, CAS Data Loggers Engineer Terry Nagy was on the barge to help users set everything up and advise them on configuring the DT-80 data logger.