RYPOS Advanced Diesel Particulate Filter for Cargo Handling Equipment

Technology Manufacturer
RYPOS, Inc.

Co-Participants
Port of Long Beach, Port of Los Angeles

Project Objective

To investigate the technical and commercial feasibility of reducing emissions from rubber tired gantry (RTG) cranes and other cargo handling equipment equipped with an active diesel particulate filter.

Technology Description

RYPOS ActiveDPF/C™ system consists of the filter housing, flow control, electrical control circuit, and filter cartridges. The electrical control circuitry automatically monitors and controls the regeneration of the filter cartridges.

The diesel particulate filter cartridge is composed of sintered metal fibers that are shaped into filter elements and then incorporated into filter cartridges. These sintered metal fiber cartridges are capable of capturing the very fine carbon particles present in the exhaust stream, with high efficiency and high holding capacity. The diesel oxidation catalyst filter cartridge reduces CO, NO2, and hydrocarbon emissions, and can act as a sound absorption device, replacing the muffler while occupying the same space.

The operation of the RYPOS ActiveDPF/C™ is controlled by a microprocessor. The controller monitors the filters and, as required, an electric current is passed through a filter element, which then acts as a heating element. A dedicated power source provides the required electrical current to heat each filter element individually to the temperature required to burn soot, reducing the maximum amount of electrical energy required. This regeneration strategy is designed to keep the back pressure below a pre-set level. The average power consumption required for regeneration is less than one percent of the rated power of the engine.

The proposed project demonstration consisted of installing the system on a RTG crane, a top handler and a side handler.

Results

In early 2012, RYPOS prepared and submitted to the California Air Resources Board an in-use operation test plan for review. During that time, tests conducted on the filter prompted a reevaluation of voltage needed for optimum regeneration as well as filter design and sizing. With much of their time focused on obtaining Level 3 verification for the RTG crane application, RYPOS determined that it was unable to move forward on developing the Active DPF/C™ system for top and side handler application. As a result, RYPOS has completed their obligations under the TAP and the project is considered complete.

Benefits

In August 2011, the RYPOS ActiveDPF/C™ was verified by CARB to reduce particulate matter in the RTG crane application at CARB Level 2-plus verification (50%, but actual test results showed 83% effectiveness). RYPOS achieved Level 3 verification (at least 85% PM reduction) of the Active DPF/C™ system for RTG cranes as part of a follow-on project. This was accomplished by adjusting the software that dictates how often regeneration occurs on an RTG crane at TraPac at the Port of Los Angeles. A final report for this Level 3 system is available on the TAP website.

Project Costs

The total project cost was $322,140. Each port contributed $64,668 in TAP funding.

Contact Information

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