

Farmrail GP20D Archoil Case Study

10.4% Improvement



Background

Farmrail of Clinton Oklahoma, a Class III common-carrier short line railroad, offered 2 different engines for test.

Test Objective

1. Reduce fuel consumption
2. Clean carbon/soot build-up from the engine and stack.

The second objective is a very important one. After 4 years of prolonged drought Farmrail encountered issues with soot and soot clinkers (a combination of soot and unburned fuel), which accumulated in the exhaust stack. They can ignite, burn off the stack wall and then exit the exhaust leading to environmental fires, including crop fires. Such losses are compensated by Farmrail at significant expense.

Products Used

- 1) AR9100 Friction Modifier and Fluid System Cleaner (added to engine oil)
- 2) AR6200 Fuel Modification Complex (added to fuel)

Any GP20D units that are leased through CIT need permission before additives are introduced. CIT guidelines stipulate a 5% limit of additives vs. total capacities and this was easily met for both products.

Test Criteria

The focus of this report is on the GP20D. The GP20D was manufactured by MotivePower and Electro-Motive Diesel and one of 40 built for CIT Group/Capital Finance between June 2000 and August 2001.

The engine were designed with improved fuel efficiency in mind. The prime mover is a Caterpillar 3516 (EMD 16-170B20-T2) - V16 cylinder fuel injected and turbo-charged diesel engine, with a total power output of 2,000hp or 1,490kW. In order to identify performance differences under identical mileage and operating conditions, two engines were paired together, one with additives and one without.

During the 2 week study the GP-20Ds, units 2025 and 2027 logged 650 miles without being decoupled between refills, respectively consuming 1,983 and 2,214 gallons of diesel. Recorded data were fuel efficiency and cleanliness of injectors, cylinder heads, and exhaust stacks.



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Farmrail GP20D Archoil Test Results

Fuel Test

- The savings during this time period for the treated units was 10.4%.
- The units tested run a consistent route of 95 miles one way with a return trip daily or 190 miles per day, 5 days a week. The savings are based on a single week run.
- The total savings per week as compared to the coupled engine was 342 gallons of fuel over 950 miles.
- The cost of fuel is based on the price of \$3.30 a gallon delivered to the engine.
- The cost of treating the fuel is based on retail numbers, or \$0.062 per gallon.
- The gross savings for a week would be \$1128.60 and after fuel treatment cost of \$176.70 of total fuel treatment the net is \$951.90.
- The cost to treat the 220 gallons engine oil, also at retail is \$1760. The return on investment would be completed after 1760 miles of travel for that engine, or based on that route of 190 miles a day would be 9.26 days.

Engine & Stack Soot Buildup

The reduction of emission build up was very noticeable on the stack and also within the cylinders and injectors.

Temperature Decrease

Temperature of the locomotives differs by 10-15 degrees with the treated unit operating cooler which can only be attributed to the additive.

