STUDIES OF REDUCED SOOT AND IRON LEVELS IN FTC TREATED FUEL

Recent fuel efficiency evaluations at five major mining sites incorporated a study of lubricating oil condition, the results of which confirm lower levels of soot ingestion and reduced iron particulates.

FTC fuel treatment provides more complete combustion which has a number of potential benefits: increased power or reduced fuel consumption, reduced carbon emissions, HC, CO, CO_2 and smoke. More complete combustion should also result in less soot ingestion into engine lubricating oil, with corresponding reductions in wear rates.

Studies by Professor Albert Bush at the UCLA Engineering School indicated reduced level of soot particulates and those particulates emitted from the engine following catalyst addition to the fuel were of a smaller particle size. Professor Bush also found in his research that iron particulates in the exhaust stream were reduced significantly. He hypothesised that the reduced level and smaller particles of soot resulted in reduced abrasive wear between piston ring and cylinder wall. Refer to photographs below.

*Particulate emissions from diesel exhaust **without** FTC (3679 x 10^6 Particles /m^3)*

*Particulate emissions from diesel exhaust **with** FTC (849 x 10^6 Particles /m^3)*

The following case studies confirm reduced levels of soot and iron in lubricating oil:

1. WESTERN AUSTRALIAN GOLD MINE - OPEN PIT MINING

Equipment: Komatsu HD-465-3 and HD785-3 Haulage Trucks

Result:	Average fuel efficiency gain	7.7%
	Average reduction in lube oil soot levels	56.4%
	Average reduction in iron levels	14.7%

2. WESTERN AUSTRALIAN GOLD MINE - OPEN PIT MINING

Equipment: Demag H241 Excavators
Dresser 630E Haulage Trucks
Caterpillar 789 Haulage Trucks
Caterpillar 785 Haulage Trucks
Terex Coal Loaders
Wabco 120C Haulage Trucks
Wabco 120CM Haulage Trucks

Result:	Average fuel efficiency gain	7.1%
	Average reduction in lube oil soot levels (C789)	10.0%
	Average reduction in iron levels (C789)	21.2%

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3. QUEENSLAND COAL MINE - OPEN PIT MINING

Equipment: Caterpillar 776 Coal Loaders
Caterpillar D9L Dozers
Caterpillar 992CLoaders

Result:	Average fuel efficiency gain	7.1% (loaded)/12.6% (u load)
	Average reduction in lube oil soil levels	31.25%

4. QUEENSLAND COAL MINE - OPEN PIT MINING

Equipment Euclid CH120
Euclid CH150

Result:	Average fuel efficiency gain	7.3%
	Average reduction in lue oil soot levels	58.0%
	Average reduction in iron levels	33.0%

There is also evidence at this mine of reduced lubricating oil consum during the four month trial period, where accurate records of filter cha and lube oil top-ups were recorded.

5. WESTERN AUSTRALIAN GOLD MINE - OPEN PIT MINING

Equipment: Caterpillar 777B Haulage Trucks
Caterpillar 773B Haulage Trucks
Leibherr 944 Excavators

Result:	Average fuel efficiency gain	7.4%
	Average reduction in lube oil soot levels	16.7%

These studies continue to prove up valuable benefits in addition to economy which will, over time, result in savings in maintenance do

Engine inspections following extended FTC use are providing evidence of cleanliness and freedom from heavy carbon deposits, with resultant low liner wear rates relative to hours of operation.

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