PETRON® CORPORATION

Proof of Performance

PETROTAC EP PREMIUM ARCTIC ON PINS AND BUSHINGS

Typically, the pins and bushings on mobile equipment are lubricated by using a good Multi-Purpose Grease (MPG). When that equipment is operating in cold ambient conditions (lower than -40°F) most conventional lubricants no longer function properly. In the past, the most common solution to this problem was take the known MPG and greatly reduce the viscosity of the base oil so that it could pump at very low ambient temperatures. This was the accepted solution for a long period of time. Recently though, innovative Petron technology has allowed us to manufacture very high viscous base fluids to form new lubricants that greatly surpass the protection offered by low-viscosity MPG.

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Case Study:

Mine in Alaska has two large loaders, the first is a 2000 Caterpillar Model 994D and the second is a 2004 Model 992G.These loaders operate in winter ambient as low as -60^{o}F.

Both Loaders were initially lubricated with conventional multi-purpose grease with a low viscosity base oil. The initial Bucket pin life and articulating pin life was extremely poor resulting in bucket pins being replaced every 6-7 months.

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Customer tried converting to a “specialty” lubricants company’s MPG in 2007. In the four years between 2007 and 2012 they had to replace the bucket pins seven times on the CAT 994 Loader. On the CAT 992 Loader the pins were replaced 14 times in the first seven years of operation.

In the Fall of 2012, customer began trying Petron Petrotac family of Open Gear Lubricants as a replacement for Multi-Purpose Grease on their entire fleet of equipment. This fleet included Haul Trucks, Shovels, Loaders, Dozers, and Graders.

Petron Open Gear Lubricants thrive in harsh environments due to their composition. Where a typical MPG uses a light oil absorbed into a soap to lubricate, Petron Open Gear Lubricants are a combination of very high viscosity base fluids combined with a very light carrier oil. This carrier oil blends with the high viscous base oil but more or less “encapsulates” it and transports it to the load zone. This process allows the lubricant to penetrate readily into the very tight tolerances of the pins and bushing of today’s modern mining equipment, and deposit the tacky very high viscous base oil and premium additives right where they can be the most beneficial.

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In the Spring of 2013 customer performed a complete bucket pin replacement procedure on the CAT 994D Loader. The old pins had failed and were cut out. A line bore procedure was also required prior to re-assembly. Petron Petrotac OGL was added to the onboard reservoir. To date, this set of bucket pins are still in use after 5 1/2 years of production.

In 2013 the CAT 992G loader was converted to Petrotac OGL without any other work being performed. Later that year those bucket pins were replaced. Customer felt the Bucket Pins were already “worn out” prior to conversion, but their loss is still noted in this study.

To date, the CAT 992G loader has operated for over 5 years on Petrotac OGL and has run over four years on the current set of bucket pins. From 2004 to 2013 the bucket pins had been replaced 15 times and from 2013 to 2018 they have been replaced once.

SAVINGS ACHIEVED

While many other factors like equipment downtime could be added to this study and greatly increase the potential savings achieved, let's just focus on the hard parts and labor cost of replacing bucket pins.

The chart below shows the cost of a set of Bucket Pins, typical line Boring procedure and the savings to the mine over the last five years.

	2007-2012	**2007-2012**	**2013-present**
Loader	Bucket Pin Cost for five years	Line Boring Cost	Savings Only Loaders
994D	$ 42,000	$ 245,000	$ 287,000
992G	$ 60,000	$ 350,000	$ 410,000
			$ 697,000