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Extending Brake Life

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When most people hear the phrase "extending brake life," they probably think about auxiliary braking or secondary braking devices. Secondary braking devices are not the subject of this article, but because that topic may have sparked some interest, I will mention that there are several of these devices on the market today for the medium and heavy duty truck class.

The most common secondary braking devices are "Jacob's" engine and exhaust brakes; automatic transmission output retarders, such as the ones produced by Allison Transmissions; and the electric driveline retarder from Telma, manufactured in France. The Telma driveline retarder is a highly reliable product developed by an engineer in France who wanted to improve brake reliability in mountainous regions of Europe. Commercial trucks would frequently lose brakes because of fade in steep downgrades, and many drivers died as a result. Telma's product has been available for more than 65 years. The success of this product in Europe is evident by the fact that secondary braking devices are required on commercial heavy duty trucks in Europe.

All of these devices and others on the market today help shorten stopping distances and, as a result, extend brake life. This also translates into a safer vehicle that will cost less in brake maintenance. In other words, it will improve the bottom line of any fleet's operation.

In this article, extending brake life refers to longevity-specifically by using one or two entirely different methods that treat the brake drum or brake rotor to increase its life. One method, the first to be used for increasing brake life or durability, is known as cryogenic treatment. Several companies across the United States offer this service. The other treatment is known as "Diamond Treatment," which is a patent-pending process from Power Brake, LLC, of St. Petersburg, Florida.

Cryogenic Treatment

First, I will talk about cryogenic treatment because it was the first one on the market and the first one we tested. Cryogenic treatment involves bringing brake drums and rotors to temperatures below −300°F. This is done in a cyclical method over a specific time period, usually six to eight hours, and controlled by a computer. The process creates a denser molecular structure in the treated metals, all of which results in improving or increasing brakes' wear factor. The cryogenic process can also be used to increase the longevity of components used in engines, transmissions, drivelines, or any number of other metal parts that tend to wear out over time because of friction.

When I first heard about cryogenic treatment about 12 years ago, only one company offered the service, and it was located in Ohio. Our shop is in Miami, Florida; naturally the shipping costs negated any potential savings. But, fortunately for us, a local company, PS Systems, later purchased a machine and offered its services to the public. We then decided to test two of our fire units-a ladder and a rescue truck. Both units were from very busy stations. The testing revealed a 30 to 40 percent increase in brake life on both vehicles. Later tests revealed that we could actually achieve up to a 100 percent increase in the brake life of vehicles that run less frequently. Needless to say, the savings in brake replacement dollars and unit downtime are significant. Another benefit of cryogenically treating your fleet's brakes is smoother braking, which ultimately equates to safer braking.

The "Diamond Treatment"

Our shop tested the second treatment process, marketed as "Diamond," about three years ago. We have documented improvements in brake life of up to 700 percent. The test truck was a single-rear-axle aerial truck that had a gross vehicle weight (GVW) of 52,500 pounds, front disc brakes, and rear drums. To put things in perspective, the OEM linings and drums would only last about 6,000 to 8,000 miles on this type of unit. This was not an anomaly, as 19 sister units also averaged about the same mileage. The truck that had the longest lasting OEM linings came into the shop at approximately 12,000 miles for a complete brake job. The test truck with the Diamond-treated linings lasted 70,000 miles and probably would have gone another 10,000 miles had the left rear slack adjuster not gotten stuck. This improvement in brake life resulted in a documented dollar savings of $9,524.22 on parts alone for the rear axle of the test truck. This does not take into account the labor time or the equipment downtime.

Because the Diamond process is still patent pending, the company has not revealed exactly what the treatment involves. Its published literature essentially states that specific elements are forced onto the cast iron surfaces of the brake drums and rotors. It does not reveal what method is used to apply these elements on the surfaces of the cast iron brake components. However, the literature does state that the elements used will completely coalesce with the metal and that it is not a coating or plating.

The process it uses is said to be unique and almost impervious to the effects of heat generated by friction. That the test truck's rear drums had minimal heat checking when brakes were replaced at 70,000 miles supports this statement. For those not familiar with the term, heat checking is basically when small cracks form on the friction surface of brake drums and rotors because of extreme temperature cycling. This is quite common in severe-service applications such as refuse, transit bus, and emergency response vehicles.

Up for Consideration

Anyone servicing brakes on medium and heavy duty trucks that operate under harsh conditions should at least consider testing these two methods for extending brake life. Another very important point is that even if you do test these treatments successfully, you still need to inspect your brakes during regularly scheduled preventive maintenance inspections. You should also monitor and track performance. You only need to look at the tragedy the Boston (MA) Fire Department experienced a few years ago in which an officer was killed when the fire truck he was in lost its brakes going downhill during an emergency call. The cause of the brake failure was essentially lack of proper maintenance. Additionally, when you look at today's shrinking budgets and the liability issues involved in brake maintenance, the benefits of either of these treatments could be incalculable.

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