Grease Sampling and Analysis for Railway Wheel Bearing Applications

Grease analysis is a reliable, cost-effective way to determine the health of grease-lubricated equipment. For years grease analysis has been used as an essential tool to monitor the health of greases and optimize grease life for railway wheel bearings. This helps to ensure availability of critical logistics equipment and maintain timely deliveries. Using data driven decisions, MRG Laboratories helps asset owners to optimize grease life. It is often found that grease lubricated assets are lubricated more frequently than necessary, creating waste of resources and manpower. Measuring wear, contamination, consistency, and anti-oxidant levels optimizes regreasing intervals and asset availability.

MRG has helped asset owners for railway bearings catch and prevent breakdowns in the field by identifying problem bearings before they can fail. An estimated savings of ~$35,000 USD per failure prevented with 15-20 failures being prevented per month. MRG helps generate savings greater than $500,000 USD in breakdown recovery and repair costs per month.

In this case study, the grease samples were collected from railway wheel bearings for screening analysis to evaluate the grease condition. To ensure that a representative sample was obtained, grease sampling was performed per ASTM D7718 and analyzed per ASTM D7918. The grease screening test slate includes ferrous wear debris analysis via the FerroQ Analyzer to identify outlier samples. Further laboratory testing can determine the amount and type of wear present leading to maintenance decisions to prevent failures while out on the tracks. Data from the testing gives insight into ferrous wear content and can be used to generate action levels for the railway wheel bearings by trending the results over time or comparing them to similar assets in the fleet.

Screening Tests

Ferrous content screening is a non-destructive test that can be performed while the grease is still in the sampling device. Grease differs from oil in that it accumulates wear until purged with new grease. Fig. 1 shows a recent sample set from railway wheel bearings with most ferrous levels being acceptable. The screening analysis identified a set of outlier samples for further analysis. Of those identified samples nineteen were noted as being in critical condition for the application and the customer acted on these identified bearings, representing 2.2% of the tested bearings.

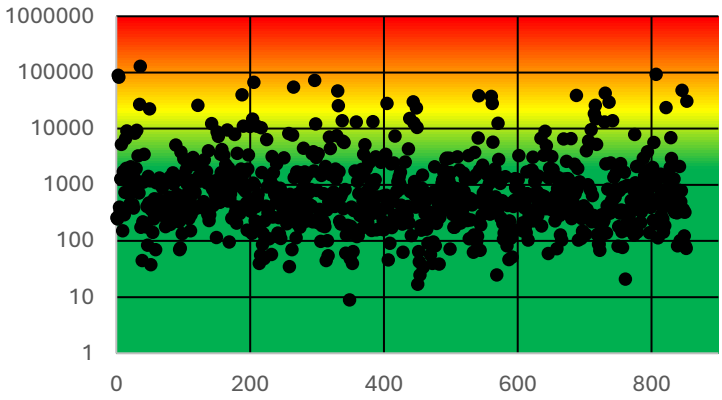

Figure 1. Shows Ferrous data (ppm) for in-service railway wheel bearing samples.

Further Lab Testing

In-service grease screening analysis gives a cheap, easy, and effective way to monitor the health of railway wheel bearings, extend asset life, and prevent costly recoveries from failures. Grease screening analysis can be used to test the wheel bearings at a depot site quickly and inexpensively. Periodic scheduled sampling can help to understand how the components are aging over time and develop fleet maintenance best practices. Screening analysis leads to identification of potential problems, and further lab analysis can be performed on these identified outlier samples in order to recognize and correct issues before they lead to failure, helping to prevent costly maintenance repairs and maximizing availability and railway productivity.

Grease Thief® Advantages:

- Remote site or location – screening can be done on-site with field testing instruments leased by MRG Laboratories.
- Representable in-service grease samples per ASTM D7718 are easily and quickly screened with The Grease Thief Pocket-Lab.
- Outlier samples can be sent to the lab for further analysis