

Developing a Standard Test Method for the Certification of Curve Grease use on Network Rail

Testing for the Best Performing Grease

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As a train negotiates a curve the outer wheel flange will contact the gauge corner of the outer rail. Conditions at this contact are very severe with high contact pressures and metal on metal sliding occurring. Grease is widely used to lubricate the rail gauge corner/wheel flange contact as a locomotive passes through a curve.

This research has the potential to benefit the railway industry particularly rail network operators such as Network Rail. The three main benefits can be summarised as:

- Less rail and wheel wear as most appropriate grease is used
- An improved understanding of the mechanics of railway lubrication and the suitable characteristics needed for a grease to give optimum performance in this field
- Better research and development into grease technology as grease manufacturers compete to tender for rail operators

Apparatus Used for these Experiments

Testing was completed using the Sheffield University Rolling Sliding (SUROS) twin-disk test rig. Ten commercial greases from several companies were tested.

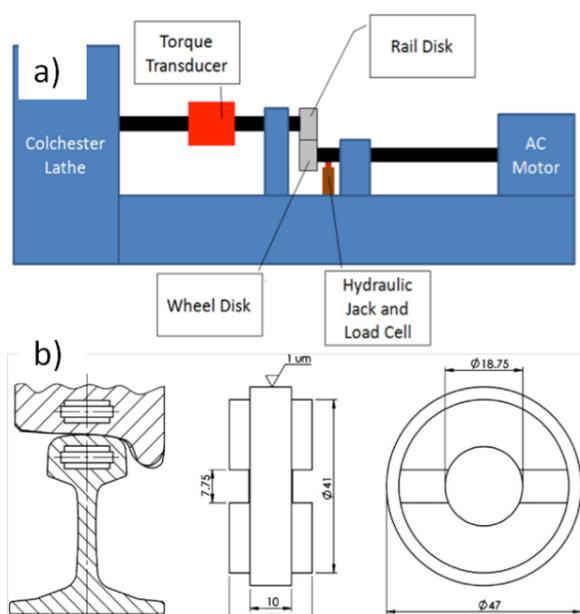


Figure 1. a) Schematic of SUROS Twin-Disc rig; b) Drawings of SUROS specimens which are cut from sections of wheel and rail

Each grease's performance was assessed in terms traction coefficient and wear. The test were split into two series: A

lubricant starvation test involved running the test until all of the grease had gone from the discs, and the other running the test up to the point where the grease just started to evaporate from the discs, referred to as a **“fully lubricated test”**.

Results

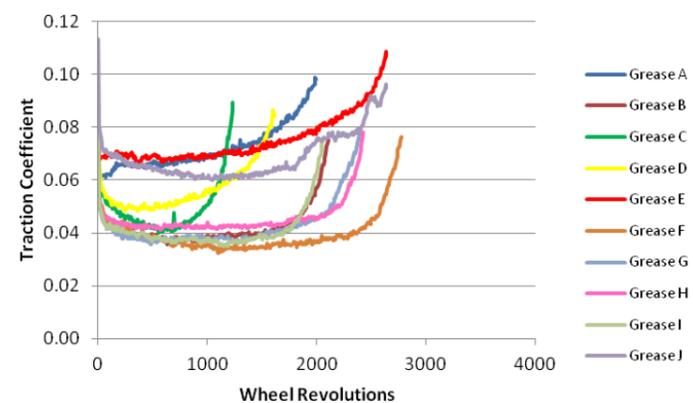


Figure 2. Traction coefficient curves for fully lubricated initial tests

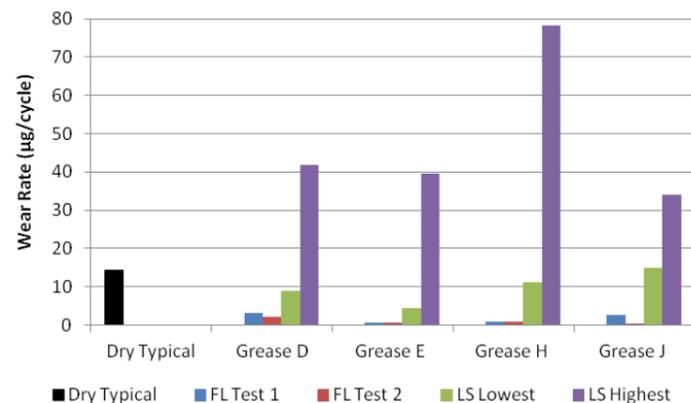


Figure 3. Wear rates of rail disc for lubrication starvation tests

Conclusions

- The test method described in this work clearly highlights the performance differences between different greases and is therefore considered suitable as a method of certification for new greases before they are introduced onto the rail network
- High wear rates are being observed under the lubrication starvation tests due to localised damage of un-lubricated sections of the disc. This in turn is leading to excessive wear of the discs in subsequent tests
- Tests should be repeated on new disc surfaces each time to mitigate the effects of changes in surface roughness on the grease performance