Cyclists often have accidents when navigating tram rails. In cities like Sheffield, this not only causes damage to people and their property but is a huge cost to local government.

Incidents generally involve bike tyres slipping on rails or dropping into the groove, yet little is known about the interaction between bike tyres and rails.

To tackle the problem, the friction between tyre and track is found for different conditions and used to model the forces in the contact.

The pendulum tests show that oil on the track hugely reduces the friction between the track and tyre. This means that the minimum safe angle is reduced even more and slipping is much more likely.

Further tests can be done with real cyclists in a controlled environment to confirm that a bike will slip into the groove at the expected angle. This is more complicated as there are many other factors at work, such as the rider’s confidence and the influence of traffic conditions.

What this study can confirm is that cyclists must take extra care in wet or oil conditions, regardless of their bike or tyre type.