Sydney Trains commenced operations on 1 July 2013, operating rail services across the metropolitan Sydney area bounded by Berowra, Emu Plains, Macarthur and Waterfall.

As well as maintaining trains, Sydney Trains also operates the network-wide Rail Management Centre, providing train control services to all operators on the Sydney metropolitan network, and is responsible for maintenance of over $32 billion in assets, including tracks, trains, signals, overhead wiring, stations and facilities.

The April technical meeting is proudly sponsored by Sydney Trains

John McLeod, Professional Head of Track Engineering at Sydney Trains and Prof. Huijun Li from the University of Wollongong will present their research into crack propagation and squat growth in rails and discuss the impacts for the rail industry in the treatment and prevention of squat defects.

Evolution of rail surface degradation in the tunnel

The role of water on squat growth under service conditions

Theoretical research hypothesises that the hydraulic entrapment of water is critical to crack propagation associated with squat growth. This explains why squats do not occur in track inside tunnels. However, metallurgical evidence from ex-service rails damaged by the presence of water at the wheel and rail interface is lacking.

A localised section of rail was discovered to have suffered severe surface damage as a result of water dripping from an air-conditioning system located in the tunnel roof. This section of rail offered an ideal controlled location for a detailed metallurgical investigation of the formation of white etching layers (WELs) under both dry and wet conditions. The study would also examine the relationship between WELs and squat initiation and the mechanics of water on crack propagation and squat growth of ex-service rail.

This presentation will reveal some of the surprising evidence gathered during this study and discuss the potential impacts for the rail industry in the treatment and prevention of squat defects.

Left: Existence of white etching layers (WELs) on rail surface under dry contact
Right: Oxides existed along the crack faces under wet contact due to water dropping

The meeting will conclude at 6.30pm, please join us for networking drinks and finger food following the meeting.