

Media briefing note: Minimising disruption during hot weather

What's the issue?

On hot days, rails in direct sunshine can be as much as 20 degrees centigrade above air temperature. As rails are made out of steel, they expand as they heat, and that expansion has to be managed.

When we install track, small gaps – called expansion joints – are left between sections of steel rails to safely allow a small amount of expansion during hot weather. If the joints have already fully closed up and the rail continues to expand, then the rail starts to go into what is known as 'compression'.

The combined system of rail, sleepers and ballast (the stones on which the rails and sleepers sit) which make up our track is designed to be able to resist these compressive forces – but in extreme cases the tracks can buckle, making it impossible to run trains.

Usually, these repairs can't be done until the temperature of the rails has dropped, causing significant disruption for passengers and freight. That's why it's so important that we take precautionary steps to stop this from happening.

Looking after passengers

If delays do occur on hot days, our signallers are trained to move trains into platforms as soon as possible and avoid passengers having to sit in hot temperatures.

Train operators also prepare by checking air conditioning, encouraging passengers to bring water with them and having stocks of water at key locations.

How do we prevent track buckling?

- ✓ Each part of our network is risk-assessed so that we know at what rail temperature the risks of track buckling are increased.
- ✓ We check the stability of the track each winter and strengthen any weaknesses before the summer arrives; typically this includes replenishing the ballast that surrounds the sleepers, and re-tensing (stretching) continuously welded rails.
- ✓ We plan to avoid work that will disturb the stability of the track during the summer as this increases the chance of a track buckle, though sometimes it cannot be avoided.
- ✓ We paint at-risk rails white so they absorb less heat, reducing rail temperatures. Typically a painted rail will be five to ten degrees cooler than an unpainted rail.
- ✓ We have also introduced sprinkler systems to cool rail temperatures at key junctions and during trials these have reduced temperatures by four degrees in ten minutes.
- ✓ We are continually enhancing our measures for calculating rail temperatures, including installing probes that give us instant alerts when track temperatures rise.
- ✓ On very hot days when high rail temperatures are widespread, we impose speed restrictions at vulnerable locations; slower trains exert lower forces on the track, reducing the risk of buckling.

Future solutions

A few years ago, we did some benchmarking with other countries to understand how they cope with hot weather. We found that countries with ballasted track systems, like ours, have the same challenges as we do.

Some countries use "slab track" where track is laid on reinforced concrete slabs rather than on sleepers and ballast, preventing tracks from buckling.

The installation cost of slab track is typically *four times* that of track laid on sleepers and ballast. Even taking into account the savings in maintenance and disruption costs, it's hard to make a business case for slab track, though we are working with suppliers to see how we can get the costs down.

For more information please contact the Network Rail press office on 020 3356 8700 or mediarelations@networkrail.co.uk.