

# Hot Weather Fact Sheet

## Did you know?

We have hundreds of Extreme Weather Action Teams on standby across the country, ready to respond quickly to fix any problems that might cause delays.

## We work hard to keep you moving in hot weather

On the railway, hot summers can be just as challenging as freezing winters. Hot weather can affect the rails, overhead power lines and the ground on which the railway is built.

We work hard to get passengers where they need to go, safely and on time by minimising the impact of hot weather on the railway.

We plan ahead to do all we can to prevent incidents that cause disruption and, when the weather gets hot, we make sure we're ready to respond to problems quickly.

## Hot weather can cause the steel rails to expand and buckle

Our network is made up of thousands of miles of steel track. Steel absorbs heat easily and tracks can get up to 20 degrees hotter than the air temperature.

When steel gets hot it expands. The rails become longer and start pushing against the pieces of track next to them. This can damage the equipment that detects where trains are and helps us keep trains a safe distance apart. When this happens, we stop trains to keep everyone safe. If there is no room for the rail to expand, the rail can buckle and we need to close the line to fix it before trains can run again. When we stop trains or close a line, this causes delays.

## We work hard to minimise delays caused by overheated rails:

- We thoroughly check the tracks ahead of summer, looking for any rails that are vulnerable to heat. We fix anything we spot.
- We paint 'hot spot' sections of track white to reduce the heat absorbed (by up to 10 degrees).
- We leave gaps between shorter sections of track so there is space for them to expand.
- On critical sections of the network, we lay track on reinforced concrete slabs rather than the usual sleepers and stones. This helps prevent rails buckling as concrete withstands greater forces.
- We have sensors across the network that let us know when parts of track are getting too hot. This realtime information helps us fix potential faults before they occur.

### Did you know?

The average UK temperature between 2011 and 2020 was warmer than the average for 1961 to 1990, meaning that buckled rails may cause increased train disruption over time, until an effective solution is found.

## Hot weather can also cause overhead power lines to expand and sag

In hot weather, the overhead lines that provide power to the trains can expand and sag. To avoid damaging the lines, trains must travel more slowly. If the overhead lines are damaged, we have to cancel or divert train services until they are fixed. This causes delays for passengers.

Modern overhead lines, which are used on the majority of Britain's rail network, are much less affected by hot weather. They have auto-tension systems with balance weights or springs that adjust to different temperatures. But older overhead lines have fixed tension and are more vulnerable.

### We work hard to minimise delays caused by overheated power lines:

- We adjust the height and tension of our older overhead power lines in summer to help prevent sagging.
- We sometimes introduce temporary speed restrictions to minimise the force on the overhead power lines. Speed restrictions reduce the risk of damage and keep services running but they can cause delays. We have to balance the inconvenience of delays to passengers against the risk of the greater disruption that would be caused if we need to fully close the line.
- We are replacing old overhead lines with modern, more resilient auto-tension power lines.

## Did you know?

**When installing steel rails, we use a process called 'stressing' to protect against buckling. This sets the range of temperatures the track can comfortably cope with.**

Stressing rails to cope with higher summer temperatures would mean making them less resilient to low temperatures during winter.

In summer, our rails have a stress-free temperature of 27 degrees and when the air temperature reaches 30 degrees, the temperature on the rail can actually be up to 20 degrees higher.

## Prolonged drought can affect the track

Long periods without rain can mean the ground underneath the tracks dries out and shrinks, creating pothole-like cracks. Much like on the roads, trains can't run at full speed over these defects and slow down to keep everyone safe.

### We work hard to minimise delays caused by drought:

- We may introduce temporary speed restrictions in affected areas to reduce the force on the track.
- We work with train operators to monitor the track closely and identify the need for maintenance caused by drought. Where the soil has significantly cracked, our engineers add more stone to support the tracks and machines realign the rails.